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(71)Applicant : MATSUSHITA ELECTRIC WORKS LTD
(72)Inventor : KOYAMA EMI
IWAI WATARU
KATAYAMA SHUJI
MORII SHOICHI
NAKANO NORIO
HAGIWARA HIROSHI
IMAI TAKEYUKI
USUI HISAMI
NIWA MASAKATSU

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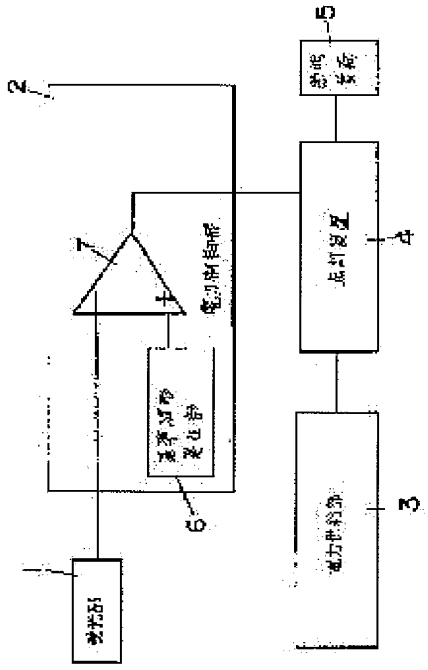
(54) LIGHTING SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a lighting system having correlation with the change of the quantity of light of sunlight, capable of adjusting organism rhythm, and easily maintaining awakening.
SOLUTION: A light receiving part 1 generates a voltage signal having correlation with (proportion to) the quality of light of sunlight. A comparison part 7 of a power control part 2 outputs a control signal of 'H' when reference voltage V0 of a reference wave form generating part 6 is higher than a voltage signal sent from the light receiving part 1. A lighting device 4 sets the lighting power (dimmer degree) of a luminescent load 5 according to the width of the control signal. The lighting device 4 sets lighting power supplied to the luminescent load 5 so that illuminance within a room which a luminescent object varies in proportion to the variation of the receiving quantity of light from sunlight (outside light) according to the width of the input control signal. Or, when the receiving quantity of light is decreased and the width of the control signal is increased, lighting power is decreased and brightness is decreased, and oppositely, when the receiving quantity of light is increased and the width of the control signal is decreased, lighting power is increased and brightness is increased.



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CLAIMS

[Claim(s)]
[Claim 1] The lighting system characterized by to have controlled lighting of the lighting load which illuminates indoor, and this lighting load, and to have the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon while changing the illuminance of the lighting region illuminated by said lighting load so that it might correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset.
[Claim 2] A lighting control means is a lighting system according to claim 1 characterized by controlling lighting of a lighting load based on the lighting control pattern which was made to correspond to transition of change of the quantity of light of the sunlight from known sunrise to sunset, and was set up beforehand.
[Claim 3] The lighting system carry out having and changing the lighting control means which consists of a power feed zone which supplies lighting power through a lighting device to the lighting device which turns on a lighting load, and a lighting load with the lighting power set up by the light sensing portion which outputs the lighting load which illuminates indoor, and the signal which receive sunlight and have the quantity of light and correlation, the power control section which have the output signal of a light sensing portion, and correlation, and set up the magnitude of the lighting power of a lighting load, and this power control section as the description.
[Claim 4] It is the lighting system according to claim 3 characterized by controlling the magnitude of the lighting power of a lighting load to have the power level setting section which set up the lighting power level which serves as a minimum beforehand, and for a power control section to measure the lighting power corresponding to the output signal of a light sensing portion, and the lighting power set up in the power level setting section, and to correspond to the lighting power of the larger one.
[Claim 5] It is the lighting system according to claim 3 characterized by to control to have the power level setting section which set up the power level which serves as beforehand an emergency power feed zone which supplies power regardless of control of a power control section with a minimum, for a power control section to add the power of an emergency power feed zone to the supply voltage of a power feed zone when the supply voltage of a power feed zone is less from the lighting power of the level set up in the power level setting section, and to supply a lighting load.
[Claim 6] The lighting system according to claim 3 characterized by adding the switch section which chooses whether the power which added the power of an emergency power feed zone to the power of the emergency power feed zone which supplies power regardless of control of a power control section, and a whether the power of only a power feed zone is supplied to a lighting load and a power feed zone is supplied.
[Claim 7] The lighting system according to claim 3 characterized by attaching the constant illuminance lighting load connected to the emergency power feed zone which supplies power regardless of control of a power control section, and an emergency power feed zone, and changing.

[Claim 8] Claim 4 characterized by changing the power level value to set up by time of day in the power level setting section, the lighting system of five publications.
[Claim 9] The lighting system according to claim 3 by which it is constituting-from same solar battery-light sensing portion and power feed zone characterized.
[Claim 10] The lighting system according to claim 5 to 7 characterized by constituting a light sensing portion and a power feed zone from same solar battery, and constituting an emergency power feed zone from a source power supply and a rectifier.
[Claim 11] Claims 3 and 7 characterized by supplying the power which added and graduated the low frequency passage filter to the output of a power feed zone or a solar battery as lighting power of a lighting load, the lighting system of eight publications.
[Claim 12] It is the lighting system according to claim 8 which considers as a value with small Nighttime and big day ranges in the power level setting section, and is characterized by making a morning stage transitorium and a stage transitorium in the evening carry out time amount change of the power set point so that the sunrise and sunset at the time of fine weather may be simulated, respectively.
[Claim 13] Claims 3 and 9 characterized by installing in a light sensing portion or a solar battery so that a light-receiving side may turn to a sunrise direction, the lighting system of ten publications.
[Claim 14] Claims 3 and 9 characterized by at least for light-receiving side moving part and the method of the sun adding a judgment means to a light sensing portion or a solar battery, and at least the method of the sun controlling light-receiving side moving part based on the decision output of a judgment means so that a light sensing portion or the light-receiving side of a solar battery follows a solar direction, the lighting system of ten publications.
[Claim 15] Claims 3 and 9 characterized by installing so that a light sensing portion or the light-receiving side of a solar battery may be suitable in the direction of a lantern light established in the building, the lighting system of ten publications.
[Claim 16] The lighting system according to claim 1 or 2 characterized by controlling lighting of a lighting load so that the illuminance after the sunset of a lighting region turns into an illuminance suitable for an activity.
[Claim 17] The lighting system according to claim 1 or 2 characterized by controlling lighting of a lighting load so that the illuminance near the noon of a lighting region turns into an illuminance which is suitable for rest at least.
[Claim 18] The lighting system according to claim 1 or 2 characterized by change of the illuminance of a lighting region being a continuous and gradual change.
[Claim 19] The lighting system according to claim 1 characterized by setting up the illuminance of the range of 1000-5000lx as a high illuminance.
[Claim 20] The lighting system according to claim 16 which carries out the description of having set up the illuminance of the range of 500-900lx as an illuminance suitable for an activity.
[Claim 21] The lighting system according to claim 17 which carries out the description of having set up the illuminance of the range of 300-600lx as an illuminance suitable for rest.
[Claim 22] The lighting system according to claim 1 or 2 which carries out the description of having made average illumination of the morning of a lighting region into size rather than the average illumination of the afternoon of a lighting region.
[Claim 23] Claims 1 and 2 characterized by making the climbing speed of the illuminance of the lighting region of ante-meridian into size rather than the lowering speed of the illuminance of the lighting region of an afternoon, the lighting system of 18 publications.
[Claim 24] The lighting system according to claim 1 or 2 characterized by giving fluctuation of illuminance change during the high illuminance period set up before or after noon.
[Claim 25] The lighting system according to claim 21 or 24 to which the illuminance of a lighting region is characterized by making smaller than the rate which rises from low level to high level the rate which descends to low level from high level.
[Claim 26] The lighting system according to claim 24 characterized by giving fluctuation to the period of illuminance change of a lighting region.
[Claim 27] A lighting load is the lighting system according to claim 1 or 2 to which it has a task

lighting load for changing the illuminance of a specific lighting region, and a means set up the important point of lighting control of a task lighting load, and needlessness, in the form superimposed on the basic lighting load and the basic illuminance for obtaining a basic illuminance, and the illuminance of a specific lighting region is characterized at least by making it change of the quantity of light of the sunlight from sunrise to sunset change.
[Claim 28] The lighting system according to claim 1 characterized by forming the local lighting instrument which bears the lighting of the location to need as a lighting load controlled by the lighting control means while forming the general lighting instrument which secures an illuminance [required for an activity and business] at its minimum.
[Claim 29] The lighting system according to claim 28 characterized by changing the illuminance within a lighting user's visual field with the lighting of a local lighting instrument if a detection means to detect a lighting user's existence or nonexistence is attached and existence of a lighting user is detected by this detection means.
[Claim 30] The lighting system according to claim 28 or 29 characterized by using lighting fitting by which adjustable control is carried out according to a lighting user's location in the direction of radiation as a local lighting instrument.
[Claim 31] The lighting system according to claim 30 characterized by for a receiving means receiving the direction-of-radiation information transmitted from the transmitting means, and changing the direction of radiation of a local lighting instrument in a lighting user's location direction based on this direction-of-radiation information.
[Claim 32] The lighting system according to claim 1 characterized by a lighting load being lighting fitting for residences.
[Claim 33] The lighting system characterized by having controlled lighting of lighting fitting which performs lighting in a vehicle, and this lighting fitting, and having the lighting control means to which the illuminance of the lighting region illuminated with said lighting fitting so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset is changed.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the lighting system which gives outdoor daylight and correlation and controls lighting the inside of a vehicle, and indoor.
[0002]
[Description of the Prior Art] There are the following four things in the field which needs the condition of lighting of having outdoor daylight and correlation. Adjustment of biorhythm (biological clock) is raised as the 1st field. There is a biological clock in the body and, as for the natural period of the biological clock, the ******** is known to 24 hours on the 1st for about 1 hour. For human being who set at the place which it follows, is under a dark room or always fixed lighting, and does not have the key of time of day, whenever it cannot perform adjustment of the time of day of a biological clock but actually follows a day as compared with the time of day of the clock of a life, the time of day of a biological clock is delay ******. In order to set a biological clock in 24 hours on the 1st, it must adjust in the direction which sets forward a clock for about 1 hour on the 1st. It is known that a stimulus of light (especially bright light) is effective in correction of such time of day of a biological clock. In the usual life according to natural environment, human being is adjusting time of day of a biological clock mainly by considering change of sunlight as a stimulus.
[0003] By the way, when adjustment of biorhythm (biological clock) does not work, causing various modulations to mind and body is known. As an intelligible example which many people experience, a jet lag symptom can be raised as abnormalities by difference of the time of day of a biological clock and the time of day of actually a life. Moreover, when a light required for adjustment of a biological clock runs short, abnormalities may be caused to biorhythm and the symptoms of season nature emotional disturbance (winter depression) may develop. Lack of light promotes biorhythm weakening by aging, and the opinion of leading to the day-and-night inversion anomalous behavior which are an old somnipathy and a part of dementia symptom, Nighttime wandering, etc. also has it. Report that abnormalities are looked at by biorhythm in many cases is among the children who cannot get up in the morning or cannot go to school.
[0004] It is known that the method of using light (high illuminance light) is effective in order to cancel or prevent such abnormalities in biorhythm (biological clock), lighting fitting is arranged the shape of equipment or a panel which equips the body and irradiates light at an eyeball, and the equipment which offers the high illuminance light source which illuminates the face is developed. As a location where it is a low illuminance and permanent conditions are assumed about an illuminance environment, a hospital, a home for the aged, an underground center, etc. are raised, and while a bright light for biorhythm (biological clock) adjustment is required, it is thought required for coincidence in these locations to modulate the light for many men. Furthermore, if modulated light which has correlation is outdoor daylight (sunlight) when modulating the light for the purpose of biorhythm adjustment in those locations, it will be thought that it is effective in maintaining or it regains a natural rhythm.
[0005] As 2nd field, the maintenance or improvement in vigilance by the bright light of day ranges is raised. Generally, it is known by receiving a luminous stimulus by the retina that

secretion of hormone called Melatonin said to induce sleepiness is controlled. Moreover, the activity of the sympathetic nervous system rises by the luminous stimulus, and it is known that vigilance will improve as a result. The inclination which becomes large has the recovery maintenance effectiveness by such light as an illuminance becomes high. In addition, it is known that the recovery maintenance effectiveness will become [the direction which has fluctuation in illuminance change] high rather than a fixed illuminance carries out long duration continuation also of the similarly bright luminous stimulus. It is more effective if the change rate at the time of an illuminance rise is especially enlarged for the change rate at the time of illuminance descent small.

[0006] Now, vigilance in the daytime changes with time amount also in daytime, although high level is usually maintained as compared with Nighttime, and it is known that some crests and troughs are shown. Among those, although a vigilance fall in the daytime is remarkable in the first half of an afternoon (equivalent to the time zone behind lunch), in spite of not taking lunch, it is known that change of vigilance will arise. Although there is individual difference in the degree of change of vigilance, when a vigilance fall in the daytime is large, the direction which takes rest once in the time zone of trough time amount is considered that subsequent working efficiency increases. Office, works, a school, an underground center, etc. are mentioned as a location where use of such a recovery maintenance operation by light is assumed.

[0007] sunshine is not taken in as 3rd field -- it is -- it is -- the equipment of a trailing type called **** "a sunflower" is known as what gives the same effectiveness as sunshine to needy living conditions. This equipment tends to introduce sunlight to living conditions with an optical fiber. As 4th field, use of the light about the lighting of places by the window, such as a store, and office, works, is known. In store lighting, generally, if outdoor daylight becomes strong, it is said that it is effective to make bright lighting of the place by the window in a store. It is for the bad influence that a store is sensed dark to arise, when the illuminance difference of the external world and a place by the window becomes large. In order to avoid this bad influence, when bright in outside, turning on many lighting by the window is performed. Moreover, when a side face is an aperture with many amounts of lighting in the interior of a room where people are usually in their room, such as office and works, daytime especially at the time of fine weather, the way large the brightness contrast of an indoor person, or a body and the window surface of a background and suitable of being visible cannot be maintained. In order to avoid such a bad influence, when bright in outside, it is said that it is effective to make head-lining lighting by the window brighter than the head-lining lighting of the center of the interior of a room.

[0008] In addition, although the illuminance of the face was an ideal, since exact measurement was difficult, the vertical illuminance in height a point of 1.2m (eyeball location when sitting on a chair) was usually used for the measuring point of an illuminance from the floor line as a substitution property. The illuminance which comes out to the following explanation is also depended on measurement in this location. In addition, the illuminance as criteria usually required for an activity etc. says the horizontal illuminance on the top face of a desk (as criteria required for an activity etc.). As for the relation of both the illuminances in the interior of a room, a horizontal illuminance will general usually be about 1.5 times the vertical illuminance.

[0009]

[Problem(s) to be Solved by the Invention] By the way, when talking generally about four fields mentioned above, there is a trouble that there is no lighting system by which modulated light control is automatically carried out so that it may have outdoor daylight and correlation. That is, in the 1st field, the available existing lighting system is a small thing aiming at the object for individual treatment, and has the trouble that attachment and detachment, ON / off control, etc. is troublesome. Furthermore, when it was said that biorhythm adjustment will be carried out in locations, such as a hospital, a home for the aged, an underground center, etc. where it is a low illuminance and permanent conditions are assumed about an illuminance environment, with existing small equipment, many number was required, and attachment and detachment, control of ON/OFF, etc. took many helps to it, and there was a trouble of not being practical.

[0010] Moreover, in the 2nd field, the available existing lighting system was not yet realized. Moreover, although the equipment the "sunflower" which is the conventional technique in the

3rd field had the very large facility and cost also became large as a result, the quantity of light obtained with an optical fiber had the trouble that it was few compared with general indoor lighting.

[0011] In the 4th field, the light of the number of lightings and class of lighting by the window was changed and modulated with hand control, and there was a trouble that it was automatic and modulated light which attains to a multistage story could not be performed. Furthermore, the technical problem that the power of the need minimal dose is secured in order to give the practicality as indoor lighting, Since the power which has outdoor daylight and correlation, always controlling the technical problem that the power source for securing the power of the need minimal dose regardless of outdoor daylight is prepared independently, and power, on setting level cannot be obtained The technical problem that power enables it to switch selection in the condition of having been controlled by setting level, or the condition of having outdoor daylight and correlation, if needed, The lighting system which receives supply of the power which is not related to outdoor daylight, the lighting system which receives supply of the power which has correlation, and outdoor daylight is divided. At the time of an activity, there are **, such as a technical problem that making it bright etc. enables it to set brightness required for indoor lighting as the level which changes with time of day, during sleeping the technical problem which enables it to use the lighting which has outdoor daylight and correlation in an indoor need part, for example, night, dark daytime.

[0012] Even if it makes a facility small, it offers a rational system and it does not depend on commercial power using sunlight, it is made to end, if practicality is further searched for in such a lighting system. Or if clouds change in response to fine fluctuation of outdoor daylight, such as crossing the sun, as it is, the technical problem referred to as cutting down commercial power consumption and making it an appropriate amount using sunlight and the power which has outdoor daylight and correlation Since there is a possibility trouble not only appears in the life in the interior of a room, but that the brightness of indoor lighting may change frequently and a lot, and a bad influence may arise to an eye, with a time constant with indoor small brightness, the technical problem it is made not to change occurs so that there may be such no trouble.

[0013] Next, there is the following as a technical problem peculiar to each field of the invention. While attaching MERIHARI of brightness in day and night at the field of the invention aiming at the 1st biorhythm adjustment as day ranges are bright and Nighttime is dark, day and night switch, the technical problem referred to as making it illuminance change not become rapid then occurs, and the technical problem that especially a morning light is attached to it importance and used in illuminance change which has outdoor daylight and correlation occurs.

[0014] Fluctuation is given to an illuminance in the field of the invention aiming at the recovery maintenance by the 2nd bright light. The technical problem that the recovery maintenance effectiveness is further heightened rather than an only bright light, the technical problem that ** -> dark is made into a rate smaller than dark -> ** about an illuminance change rate, The technical problem that illuminance change is regular and it is made not to become monotonous, and illumination control are divided into basic lighting and task lighting, and the technical problem that suitable control is carried out according to an individual condition with task lighting occurs.

[0015] the 3rd sunshine -- in the field of the invention aiming at the optical supplement to needy living conditions, the technical problem that many light is taken in as much as possible indoors occurs in the lighting which has outdoor daylight and correlation. Although the lighting which has outdoor daylight and correlation is arranged by the window and indoor illuminance amendment is performed in the field of the invention aiming at illuminance amendment with the 4th lighting by the window, the technical problem that the outdoor daylight and correlation which carry out incidence from an aperture are given occurs.

[0016] It is in offering the lighting system which this invention is made for the purpose of solving an above-mentioned technical problem, and has transition and correlation of the quantity of light of sunlight, and biorhythm adjustment can be performed, and maintenance of vigilance tends to carry out. In addition, the practicality as indoor lighting is given, and further, while using a facility as a rational system small, it aims at offering a lighting system which cuts down commercial power consumption.

[0017] Furthermore, the lighting system which can adjust biorhythm better with the lighting which has outdoor daylight and correlation Moreover, the lighting system which can control light which the vigilance of day ranges is raised in office etc. and working efficiency goes up moreover, sunshine -- it aims at offering the lighting system which enlarges the illuminance of lighting by the window for the lighting system which can be illuminated with light like a nature also to needy living conditions when bright further again in the outside of an aperture, and does not produce trouble in how in the interior of a room to be visible.
[0018]
[Means for Solving the Problem] In order to attain the above-mentioned purpose in invention of claim 1 While changing the illuminance of the lighting region illuminated by said lighting load so that lighting of the lighting load which illuminates indoor, and this lighting load may be controlled and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon. Since the account illuminance of predetermined period Nakamae before and behind noon is made into an illuminance higher than the average illumination of the morning or an afternoon at least, while being able to carry out biorhythm adjustment, a vigilance fall in the daytime can be controlled and vigilance can be maintained.
[0019] It is characterized by for a lighting control means to control lighting of a lighting load by invention of claim 2 in invention of claim 1 based on the lighting control pattern which was made to correspond to transition of change of the quantity of light of the sunlight from known sunrise to sunset, and was set up beforehand, and since sunlight receives and lighting control does not perform, the lighting control pattern of the form [pattern / lighting control] according to the optimal form and the optimal operating condition for biorhythm can set up beforehand.
[0020] The lighting load which illuminates indoor in invention of claim 3, and the light sensing portion which outputs the signal which receives sunlight and has the quantity of light and correlation, The power control section which has the output signal of a light sensing portion, and correlation, and sets up the magnitude of the lighting power of a lighting load, It is what was characterized by having the lighting control means which consists of a power feed zone which supplies lighting power to the lighting device which turns on a lighting load, and a lighting load through a lighting device with the lighting power set up by this power control section. An illuminance which has sunlight and correlation can be obtained and it becomes effective in carrying out in the form where are the form where a natural rhythm is regained for biorhythm adjustment, or a rhythm and the vigilance of daytime are maintained.
[0021] It has the power level setting section which set up the lighting power level which serves as a minimum beforehand in invention of claim 3 in invention of claim 4. It is characterized by a power control section controlling the magnitude of the lighting power of a lighting load to measure the lighting power corresponding to the output signal of a light sensing portion, and the lighting power set up in the power level setting section, and to correspond to the lighting power of the larger one. A necessary minimum illuminance can be secured and the practicality as indoor lighting can be given.
[0022] It has the power level setting section which set up the power level which serves as beforehand an emergency power feed zone which supplies power regardless of control of a power control section with a minimum in invention of claim 3 in invention of claim 5. It is characterized by controlling a power control section to add the power of an emergency power feed zone to the supply voltage of a power feed zone, and to supply a lighting load, when the supply voltage of a power feed zone is less from the lighting power of the level set up in the power level setting section. By preparing independently the power source for securing the lighting power for obtaining the necessary minimum illuminance which is not related to outdoor daylight, the lighting power for obtaining a necessary minimum illuminance can be secured, and the practicality as indoor lighting can be given.
[0023] The emergency power feed zone which supplies power regardless of control of a power control section in invention of claim 3 in invention of claim 6, It is characterized by adding the

switch section which chooses whether the power of only a power feed zone is supplied to a lighting load, or the power which added the power of an emergency power feed zone to the power of a power feed zone is supplied. When there is little power of a power feed zone, lighting power of a lighting load can be made into constant value, a necessary minimum illuminance can be secured, and when the power of a power feed zone is enough, an emergency power feed zone can be separated, and lighting of a lighting load can be controlled to become outdoor daylight and the illuminance which has correlation.

[0024] It is characterized by attaching the constant illuminance lighting load connected to the emergency power feed zone which supplies power regardless of control of a power control section, and an emergency power feed zone in invention of claim 3 in invention of claim 7, and changing. While being able to use alternatively in the part which needs the lighting which has outdoor daylight and correlation indoors, in other parts, fixed power can always be secured and the practicality as indoor lighting can be given.

[0025] In invention of claim 8, since the power level value set as claims 4 and 5 in the power level setting section in invention is changed by time of day, at the time of an activity, making it bright etc. can set brightness required for indoor lighting as the level which changes with time of day during sleeping dark daytime at night. In invention of claim 9, in invention of claim 3, it can consider as the constituting-from same solar battery-light sensing portion and power feed zone description, a facility can be made small, a rational system can be offered, and practicality can be further raised in the lighting system which has outdoor daylight and correlation.

[0026] It is characterized by having constituted the light sensing portion and the power feed zone from same solar battery, and constituting an emergency power feed zone from invention of claim 10 with a source power supply and a rectifier in invention of claims 5-7, in invention according to claim 5 to 7, and makes a facility small, and it can cut down commercial power consumption using sunlight, and it not only can offer a rational system, but can make it an appropriate amount.

[0027] It is characterized by supplying the power which added and graduated the low frequency passage filter to the output of a power feed zone or a solar battery in invention of claims 3, 7, and 8 in invention of claim 11 as lighting power of a lighting load. Can supply the graduated power to the lighting system which is a load, and indoor brightness ceases to change in a small time constant. The power which has outdoor daylight and correlation changes in response to fine fluctuation of outdoor daylight, like clouds cross the sun as it is, the brightness of indoor lighting changes frequently and a lot, and there is no fear, like trouble not only appears in the life in the interior of a room, but a bad influence arises to an eye.

[0028] In invention of claim 12, it sets to invention of claim 8. In the power level setting section It is characterized by considering as a value with small Nighttime and big day ranges, and making a morning stage transitorium and a stage transitorium in the evening carry out time amount change of the power set point so that the sunrise and sunset at the time of fine weather may be simulated, respectively. Brightly [daytime], while attaching MERIHARI of brightness in day and night as dark, as day and night switch and illuminance change does not become rapid then, a biorhythm adjustment function can be raised at night.

[0029] In invention of claim 13, it sets to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. The day ranges characterized by installing so that a light-receiving side may turn to a sunrise direction are bright, and while attaching MERIHARI of brightness in day and night and making it illuminance change not become rapid at the end treatment rate of day and night as dark, Nighttime Especially a morning light can be attached to it importance and used in illuminance change which has outdoor daylight and correlation, and a biorhythm adjustment function can be raised further.

[0030] In invention of claim 14, at least light-receiving side moving part and the method of the sun add a judgment means to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. It is characterized by at least the method of the sun controlling light-receiving side moving part based on the decision output of a judgment means so that a light sensing portion or the light-receiving side of a solar battery follows a solar direction. a light-receiving side follows a solar direction -- as -- being controllable -- sunshine -- when aiming at the optical supplement

to needy living conditions, many light can be taken in as much as possible indoors.
[0031] In invention of claim 15, in invention of claims 3, 9, and 10, the outdoor daylight which is characterized by installing so that a light sensing portion or the light-receiving side of a solar battery may be suitable in the direction of a lantern light established in the building, and carries out incidence from an aperture, and the lighting which has correlation can be arranged by the window, and the engine performance of illuminance amendment with lighting by the window can be raised. Since lighting of a lighting load is controlled by invention of claim 16 so that the illuminance after the sunset of a lighting region turns into an illuminance suitable for an activity in claim 1 or invention of 2, it does not become a real activity top problem, but a required illuminance can be secured.
[0032] Since lighting of a lighting load is controlled by invention of claim 17 to become the illuminance to which the illuminance near noon of a lighting region is suitable for rest at least in claim 1 or invention of 2, in the stage of a vigilance fall of an afternoon, rest can be taken once, and subsequent working efficiency can be raised more. In invention of claim 18, in claim 1 or invention of 2, since change of the illuminance of a lighting region is a continuous and gradual change, it becomes easy to carry out maintaining the vigilance of bringing close to change of the natural light and regaining a natural rhythm, a rhythm, or day ranges.
[0033] In invention of claim 19, in invention of claim 1, it is characterized by setting up the illuminance of the range of 1000-5000lx as a high illuminance, biorhythm adjustment becomes more effective, and improvement in maintenance of vigilance can also be aimed at. In invention of claim 20, in claim 16, since the illuminance of the range of 500-900lx was set up as an illuminance suitable for an activity, improvement in working efficiency can be aimed at.
[0034] In invention of claim 21, in invention of claim 17, since the illuminance of the range of 300-600lx was set up as an illuminance suitable for rest, it becomes effective in rest. In invention of claim 22, in claim 1 or invention of 2, it is characterized by making average illumination of the morning of a lighting region into size rather than the average illumination of the afternoon of a lighting region, and is easy to carry out recovery maintenance. Moreover, it is more effective also for biorhythm adjustment.
[0035] In invention of claim 23, in claims 1, 2, and 18, it is characterized by making the climbing speed of the illuminance of the lighting region of ante-meridian into size rather than the lowering speed of the illuminance of the lighting region of an afternoon, and is easy to carry out recovery maintenance. Moreover, it is more effective also for biorhythm adjustment. In invention of claim 24, it is characterized by giving fluctuation of illuminance change, and is easier to carry out recovery maintenance during the high illuminance period set up before or after noon.
[0036] In invention of claim 25, in claim 21 or invention of 24, the illuminance of a lighting region is characterized by making smaller than the rate which rises from low level to high level the rate which descends to low level from high level, and becomes effective in raising vigilance. In invention of claim 26, in invention of claim 24, it is characterized by giving fluctuation to the period of illuminance change of a lighting region, and becomes effective by maintaining vigilance.
[0037] In invention of claim 27, it sets to claim 1 or invention of 2. A lighting load The task lighting load for changing the illuminance of a specific lighting region in the form superimposed on the basic lighting load and basic illuminance for obtaining a basic illuminance, Having a means to set up the important point of lighting control of a task lighting load, and needlessness, and the illuminance of a specific lighting region being characterized by making it change like quantity of light change of the sunlight from sunrise to sunset at least, and holding down the power consumption by the whole lighting Lighting control which can adjust the biorhythm in individual level can be performed.
[0038] While forming the general lighting instrument which secures an illuminance [required for an activity and business] at its minimum in invention of claim 1 in invention of claim 28 It is characterized by forming the local lighting instrument which bears the lighting of the location to need as a lighting load controlled by the lighting control means. Only a required place can be irradiated with a high illuminance with a local lighting instrument, therefore lighting control which can adjust the biorhythm in a lighting user's individual level can be performed with little lighting energy.

[0039] Since it will control by invention of claim 29 only when it is characterized by changing the illuminance within a lighting user's visual field with the lighting of a local lighting instrument and a lighting user exists if a detection means to detect a lighting user's existence or nonexistence is attached in invention of claim 28 and existence of a lighting user is detected by this detection means, futility is lost. It is characterized by using lighting fitting by which adjustable control is carried out according to a lighting user's location in the direction of radiation as a local lighting instrument in claim 28 or invention of 29 in invention of claim 30. Since the need of installing lighting fitting in consideration of all the locations considered that an illuminance required in a lighting user's visual field can be given, and it must irradiate is lost even if it is not under a local lighting instrument, the number of a local lighting instrument ends few.
[0040] It is characterized by for a receiving means receiving the direction-of-radiation information transmitted from the transmitting means in invention of claim 30 in invention of claim 31, and changing the direction of radiation of a local lighting instrument in a lighting user's location direction based on this direction-of-radiation information. Since the direction of radiation of a local lighting instrument can be set up in the direction for which it asks by the lighting user's itself operating a transmitting means and making direction-of-radiation information transmit, the direction of radiation can be easily set up in the lighting user's existence location direction, and it becomes possible to give an illuminance required in a lighting user's visual field.
[0041] In invention of claim 32, in invention of claim 1, it is characterized by a lighting load being lighting fitting for residences, and the lighting which can adjust a lighting user's biorhythm is obtained in a living environment. While changing the illuminance of the lighting region illuminated with said lighting fitting so that lighting of lighting fitting which performs lighting in a vehicle, and this lighting fitting may be controlled by invention of claim 33 and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon, and lighting control which can adjust a lighting user's biorhythm can be performed corresponding to time difference, the arrival time, etc.

[0042]
[Embodiment of the Invention]
Drawing 1 shows this operation gestalt and this operation gestalt receives sunlight. (Operation gestalt 1) The light sensing portion 1 which outputs the signal which has the quantity of light and correlation and which consists of photo detectors, such as a solar battery or CdS, for example, The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to a light sensing portion 1 and has the output signal of a light sensing portion 1, and correlation, It consists of power feed zones 3 which supply power to the lighting load 5 through the lighting device 6 which carries out continuation modulated light lighting of the lighting load 5, and this lighting device 4 with the lighting power according to the control signal of the power control section 2.
[0043] With this operation gestalt (even other operation gestalten described below are the same), using a electric-discharge lamp load like a fluorescent lamp, the lighting load 5 carries out adjustable [of the oscillation frequency] to a lighting device 4 according to the width of face of the control signal from the outside corresponding to this, changes the impedance for stabilizers, and uses inverter equipment with the continuation modulated light function which controls lighting power (lamp current). In addition, when an incandescent lamp and a halogen lamp are lighting loads, a dimmer which controls lighting power by phase control etc. according to the width of face of the control signal from the outside is used. You may be lighting devices other than such [, of course] a method. Moreover, the power feed zone 3 uses what supplies direct current power to the lighting device 4 which is inverter equipment.
[0044] Next, actuation of this operation gestalt is explained in full detail. A light sensing portion 1 outputs the voltage signal which has the quantity of light of sunlight, and correlation (proportionality) to the power control section 2. The power control section 2 is the reference voltage signal V0 of the reference-waveform generating section 6 which consists of a

comparator 7 which compares the reference voltage signal of the triangular waveform of predetermined frequency and the voltage signal from a light sensing portion 1 which are generated in the reference-waveform generating section 6, and shows a comparator 7 to drawing 2 (a). Voltage signal V1 from a light sensing portion 1 When high, "H" output is taken out as shown in drawing 2 (b), and the "L" output is taken out when [that] opposite. That is, if the light-receiving quantity of light of sunlight increases and the light-receiving quantity of light will decrease conversely a control signal with small signal width of face again, signal width of face will generate the large control signal of "H", and will output to a lighting device 4.

[0045] A lighting device 4 sets up the lighting power supplied to the lighting load 5 so that it may change, as the indoor illuminance (for example, illuminance on the top face of a desk) which is a candidate for lighting shows drawing 3 (b) in proportion to change of the light-receiving quantity of light (outdoor daylight) from the sun shown in drawing 3 (a) according to the width of face of the control signal to input. That is, if the light-receiving quantity of light decreases and the width of face of a control signal becomes large, a lighting device 4 will make lighting power small according to it, will make the optical output of the lighting load 5 small, and will reduce the illuminance of a lighting region. Conversely, if the light-receiving quantity of light increases and the width of face of a control signal becomes small, lighting power is enlarged, the optical output of the lighting load 5 will be made to increase, and the illuminance of a lighting region will be made high.

[0046] Drawing 4 shows this operation gestalt, and this operation gestalt receives sunlight so that it may illustrate. (Operation gestalt 2) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, While having the power feed zone 3 which supplies power to the lighting load 5 through the lighting device 4 which carries out continuation modulated light lighting of the lighting load 5, and this lighting device 4 with the lighting power according to the control signal of the power control section 2 It consists of the power level setting sections 8 for setting up beforehand the minimum level of the lighting power of the lighting load 5. With a **** operation gestalt, the thing of the configuration as the operation gestalt 1 with same light sensing portion 1, lighting device 4, lighting load 5, and power feed zone 3 is used.

[0047] Next, actuation of this operation gestalt is explained in full detail. A light sensing portion 1 generates the voltage signal which has the quantity of light of sunlight, and correlation (proportionality) like the operation gestalt 1. The power control section 2 consists of a comparator 7 which compares the reference voltage signal of the triangular waveform of predetermined frequency and the voltage signal from a light sensing portion 1 which are generated in the reference-waveform generating section 6, and a comparator 7 is the reference voltage V0 of the reference-waveform generating section 6. Voltage signal V1 from a light sensing portion 1 When high, a comparator 7 takes out "H" output, and when [that] opposite, it takes out the "L" output (refer to drawing 2 (a) and (b)). The control signal constituted by "H" output is inputted into AND circuit 9 with the setting signal outputted from the power level setting section 8, and an AND is taken.

[0048] The setting section 11 which sets up the power level from which the power level setting section 8 serves as the reference-waveform generating section 10 and a minimum and which consists of volume 12 and a source 13 of reference voltage, for example, Consist of a comparator 14 and the reference-waveform generating section 10 outputs the reference voltage signal of a triangular waveform like the reference-waveform generating section 6 of the power control section 2. A comparator 14 outputs the signal of "H", when a reference voltage signal is compared with the output voltage of the setting section 11 and the reference-waveform generating section 10 reference-voltage signal is over the output voltage of the setting section 11. In addition, the reference-waveform generating sections 6 and 10 shall synchronize, and shall output the same wave-like reference voltage signal.

[0049] Therefore, if the output signal of a comparator 7 is outputted to a lighting device 4 as a control signal and the width of face of the output signal of a comparator 7 becomes larger than

the width of face of the output signal of a comparator 14 when the width of face of the output signal of a comparator 7 is smaller than the width of face of the output signal of a comparator 14, the output signal of a comparator 14 will be outputted to a lighting device 4 as a control signal. That is, when the light-receiving quantity of light of a light sensing portion 1 decreases and the width of face of the output signal of a comparator 7 becomes larger than the width of face of the output signal of a comparator 14, the width of face of a control signal is fixed to the width of face of the output signal of a comparator 14. Therefore, the minimum level of lighting power will be set up with the width of face of the output signal of a comparator 14.

[0050] The lighting power supplied to the lighting load 5 so that it may change, as the indoor illuminance (for example, illuminance on the top face of a desk) which is a candidate for lighting shows drawing 5 (b) in proportion to change of the light-receiving quantity of light (outdoor daylight) from the sun shown in drawing 5 (a) according to the width of face of the control signal which it ** and is inputted in the lighting device 4 of this operation gestalt is set up. That is, if lighting power is made small, an illuminance is reduced and the light-receiving quantity of light increases conversely when there is little light-receiving quantity of light, lighting power will be enlarged and an illuminance will be made high. Moreover, if the light-receiving quantity of light of a light sensing portion 1 becomes below fixed, it will fix to the illuminance of the minimum level set up beforehand, and a necessary minimum illuminance will be secured.

[0051] Drawing 6 so that this operation gestalt may be shown and it may illustrate (Operation gestalt 3) With this operation gestalt As a power source of supply which supplies lighting power to the lighting load 5 through a lighting device 4 Diode D2 for antisuckbacks The power feed zone 3 which consists of a solar battery which minded and connected the outgoing end to the power-source input edge of a lighting device 4, The current-limiting circuit 16 and diode D1 for antisuckbacks The emergency power feed zone 15 which consists of a source power supply which minded and connected the outgoing end to the power-source input edge of a lighting device 4, and a rectifier is used.

[0052] Moreover, the power level setting section 20 which consists of the variable attenuator 17 and the reference-waveform generating section 18 which input **** of the power-source input edge of a lighting device 4, and a comparator 19 is attached. A lighting device 4 controls the lighting power of the lighting load 5 in response to the control signal from the power level setting section 20 and the power control section 2, and carries out modulated light lighting of the lighting load 5. The power control section 2 outputs a control signal with the width of face correlated with the quantity of light of sunlight in response to the output of a light sensing portion 1 like the thing of the operation gestalten 1 and 2, and is omitting by drawing 6 about the internal configuration.

[0053] The reference-waveform generating section 18 of the power level setting section 20 outputs the reference voltage of the same triangular waveform as the reference-waveform generating section 6 of the power control section 2. Next, actuation of this operation gestalt is explained in full detail. If it ** and is working [a system], an electric power supply is performed from the power feed zone 3 and the emergency power feed zone 15 to a lighting device 4, but when lighting power increases, the burden of the emergency power feed zone 15 also becomes large.

[0054] Although the power supply of the emergency power feed zone 15 is small because of the auxiliary role of the power control section 2, and the output current increases when the lighting power of a lighting device 4 increases and a burden becomes large, the current-limiting circuit 16 will receive the current limiting. although the burden by the side of the power feed zone 3 will increase, since [therefore,] there is a limitation also in the power which can supply the power feed zone 3 -- the power which can supply the power feed zone 3 -- ** -- when lighting power is larger than the power which combined the power which can supply the emergency power feed zone 15, it will be in an overload condition and the input voltage of the lighting device 4 which is a load will decline.

[0055] On the other hand, the power level setting section 20 generates the electrical potential difference which inputs the input voltage of a lighting device 4 into variable attenuator 17, and ****s in the voltage level corresponding to that electrical potential difference, a comparator 19

compares this electrical potential difference and the reference voltage which the reference-waveform generating section 18 outputs, and if the same control signal as the power control section 2 is outputted from a comparator 19 and the input voltage of a lighting device 4 declines as mentioned above, in connection with it, the width of face of a control signal will become large. As for the control signal of this power level setting section 20, an OR is taken by the control signal and OR circuit 48 from the power control section 2. Even if the width of face of the control signal which it inputs into a lighting device 4, for example, the light income of a light sensing portion 1 increases, and is outputted from the power control section 2 becomes small When the input voltage of a lighting device 4 declines according to an overload condition as mentioned above, the width of face of the control signal of the power level setting section 20 becomes larger than the width of face of the control signal outputted from the power control section 2, and a lighting device 4 operates in the direction which makes lighting power small in response to this control signal. That is, lighting power will be controlled to make the lighting load 5 turn on with the lighting power according to the maximum power which can carry out current supply of the power feed zone 3 and the emergency power feed zone 15.

[0056] Drawing 7 shows this operation gestalt, and this operation gestalt receives sunlight so that it may illustrate. (Operation gestalt 4) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, A lighting device 4 like the modulated light lighting device which makes the lighting load 5 turn on with the lighting power according to the control signal of the power control section 2, While having the power feed zone 3 which supplies power to the lighting load 5 through this lighting device 4, it has the emergency power feed zone 15. the output of this emergency power feed zone 15 -- diode D1 for back flow inhibition Switch SW1 minding -- the power-source input edge of a lighting device 4 -- moreover, the output of the power feed zone 3 -- diode D2 for back flow inhibition It minds and has connected with the power-source input edge of a lighting device 4.

[0057] In the configuration of a light sensing portion 1, and the lighting device 4, the lighting load 5 and the power feed zone 3, according to the operation gestalt 1, the configuration of the emergency power feed zone 15 shall have applied to the operation gestalt 3 here. Moreover, the power control section 2 is 2 contact change-over switch SW2 about the outgoing end of a comparator 7. It has connected with one stationary contact a, and is a change-over switch SW2. If a traveling contact is connected to a stationary contact a The control signal which a comparator 7 outputs is inputted into the signal input edge of a lighting device 4, and it is a change-over switch SW2. If a traveling contact is connected to a stationary contact b, the control signal which a comparator 7 outputs will not be outputted to a lighting device 4, but the signal input edge of a lighting device 4 will be connected to a gland.

[0058] Switch SW1 Change-over switch SW2 It interlocks and is a switch SW1. When it is an ON state, it is a change-over switch SW2. It connects with a stationary-contact b side, and a traveling contact is a switch SW1. When it is an OFF state, it is a change-over switch SW2. A traveling contact is connected to a stationary-contact a side. Next, actuation of this operation gestalt is explained in full detail.

[0059] It is a switch SW1 first. OFF connects the outgoing end of the power control section 2 to the signal input edge of a lighting device 4. In this case, it becomes the same circuitry as the operation gestalt 1, and succeeds in the same actuation. Since the explanation of operation in this case is the same as the operation gestalt 1, explanation is omitted. Subsequently, switch SW1 When turned on, it interlocks and is a change-over switch SW2. A traveling contact is connected to a stationary-contact b side, and, for this reason, the signal input edge of a lighting device 4 serves as "L" level. That is, the width of face of a control signal serves as zero, and a lighting device 4 carries out the all-points LGT of the lighting load 5. In this case, it will be supplied from the power feed zone 3 and the emergency power feed zone 15, and will succeed in sufficient electric power supply to carry out the all-points LGT of the lighting load 5.

[0060] That is, the lighting system which has outdoor daylight and correlation according to this

operation gestalt is a switch SW1. By making it turn off, it can realize and is a switch SW1. The system by which a user can choose the mode of an all-points LGT regardless of outdoor daylight can be constituted by turning on. What is necessary is just to use the power circuit which consists of a source power supply and a rectifier as an emergency power feed zone 15, using a solar battery as the light sensing portion 1 and the power feed zone 3 of a **** operation gestalt. Of course, it is not limited to this configuration.

[0061] (Operation gestalt 5) the form which drawing 8 shows this operation gestalt and adds this operation gestalt to the system of the operation gestalt 1 -- ** -- the system which consists of lighting load 5' turned on by the emergency power feed zone 15, the constant illuminance lighting device 47, and this constant illuminance lighting device 47 is formed, and the lighting system of this invention is built by both [these] systems.

[0062] Next, actuation of this operation gestalt is explained in full detail. First, since the same part (inside of Frame X) as the operation gestalt 1 in drawing 8 achieves the same function, it omits explanation. Lighting power is supplied and the constant illuminance lighting device 47 makes lighting load 5' turn on with the power from the emergency power feed zone 15, in the system in Frame Y, so that the illuminance of a lighting region may become fixed.

[0063] Therefore, with this operation gestalt, the illuminance correlated with the quantity of light of the sunlight obtained by the system of Frame X based on the lighting **** fixed illuminance of lighting load 5' of Frame Y will be overlapped. Moreover, if arrangement of lighting load 5' turned on by the lighting load 5 turned on by the lighting device 4 by the system in Frame X and the constant illuminance lighting device 47 in Frame Y can be divided, for example, the lighting load 5 is arranged by the window and lighting load 5' is arranged all over head lining, it will be superimposed on the illuminance correlated with the quantity of light of sunlight by the window, and indoor illuminance amendment can be performed.

[0064] It is good to use the power circuit which consists of a source power supply and a rectifier as an emergency power feed zone 15, using a solar battery as the light sensing portion 1 and the power feed zone 3 of a **** operation gestalt. Of course, it is not limited to this configuration. Drawing 9 shows this operation gestalt and this operation gestalt receives sunlight like the operation gestalt 2. (Operation gestalt 6) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, While having the power feed zone 3 which supplies power to the lighting load 5 through a lighting device 4 like the modulated light lighting device which makes the lighting load 5 turn on, and this lighting device 4 with the lighting power according to the control signal of the power control section 2 Although it consists of the power level setting sections 8 for setting up beforehand the minimum level of the lighting power of the lighting load 5, the setting section 9 of the power level section 6 of this operation gestalt differs from the case of the operation gestalt 2 at the point which consists of a timer 22, and ROM23 and the D/A transducer 24.

[0065] The data of power level with which the day was set up beforehand are written in ROM23 of the setting section 6, and a timer 22 outputs the read-out address data of ROM23 according to time of day with progress of time of day. That is, the data of power level according to progress of time of day are read from ROM23 every moment, are changed into the voltage signal of an analog by the D/A transducer 24 connected to the outgoing end of ROM23, and are inputted into a comparator 14.

[0066] Next, actuation of this operation gestalt is explained in full detail. First, a timer 22 outputs current time of day in the form of the address data of ROM23, and ROM23 outputs the power level data stored in the specified address. The D/A transducer 24 outputs power level data as a voltage signal of an analog, as for this outputted voltage signal, the reference voltage signal of the reference voltage wave generating 10 is compared by the comparator 14, and a comparator 14 outputs the signal of the width of face corresponding to the period when the reference voltage signal exceeded the voltage signal from the D/A transducer 24. While the width of face of this signal is larger than the width of face of the control signal outputted from the comparator 7 of the power control section 2, the control signal of a comparator 7 is given to a lighting device

4 through AND circuit 9, and when the width of face of the signal of a comparator 14 becomes smaller than the width of face of the control signal outputted from the comparator 7 of the power control section 2, the signal of a comparator 14 will be given to a lighting device 4 as a control signal through AND circuit 9.
[0067] That is, with this operation gestalt, it can set up with the power level which has written the minimum level of an illuminance in ROM23 beforehand according to time of day, and by the daytime of the day of cloudiness with little light-receiving quantity of light of sunlight, or rain, the lighting power of the lighting load 5 can be controlled based on the power level data from ROM23, and a predetermined illuminance can be secured. In addition, as data of the power level written in ROM23, if it considers as a value with small Nighttime and big day ranges and is the value which simulates the sunrise and sunset at the time of fine weather, respectively at a morning stage transitorium and a stage transitorium in the evening, a desirable illuminance pattern will be obtained. As an especially desirable pattern, that from which brightness serves as max is good during the morning, and it is convenient if 1000 thru/or the indoor illuminance of the range of 5000lx(es) are obtained.
[0068] Moreover, if the LAT is high, the seasonal difference of sunrise time of day will become large, but if sunrise becomes late extremely in winter, it will be thought that it is not desirable for biorhythm adjustment. In such a case, if the standard illuminance change pattern of spring or autumn is set up, the seasonal difference of sunrise time of day can be amended, and a desirable illuminance pattern can be obtained for biorhythm adjustment.
[0069] Drawing 10 graph-izes serially an example of writing-in ROM23 power data. As another example (drawing abbreviation), the set point in the first half of ante-meridian can be made especially high (1000-5000lx), and the set point of subsequent daytime can also be set as the usual indoor brightness (for example, 500lx extent).
[0070] The configuration of the D/A transducer 24 which carries out D/A conversion of the data of the timer 22 which outputs the address of ROM and ROM which wrote in the data of power level with which the day used for this operation gestalt 6 was set up beforehand as time-of-day data, and the power level outputted from ROM23 If it adds to the current-limiting circuit 16 in the operation gestalt 3 and the threshold of the current-limiting circuit 16 is controlled by the output of the D/A transducer 24, the lighting system to which a minimum or the power level to set up is changed by time of day is realizable.
[0071] (Operation gestalt 7) drawing 11 shows the operation gestalt of this invention, this operation gestalt is what made the power feed zone serve a double purpose by light sensing portion 1' which consists of a solar battery which receives sunlight, and the configuration of the power control section 2, a lighting device 4, and the lighting load 5 has the same composition as the operation gestalt 1 so that it may illustrate -- it comes out.
[0072] Next, actuation of this operation gestalt is explained in full detail. When the output power of light sensing portion 1' which consists of a solar battery is smaller than the lighting power which a lighting device 4 supplies to the lighting load 5, the output voltage of light sensing portion 1' which consists of a solar battery declines. The power control section 2 outputs a control signal with the width of face which ****ed in the output power of the solar battery which compares output voltage with the reference voltage of the reference voltage wave generating section 15 according to the light-receiving quantity of light of light sensing portion 1', and constitutes light sensing portion 1' to a lighting device 4.
[0073] When the lighting load 5 controlled by the lighting device 4 as a result has little light-receiving quantity of light to which the output voltage of the solar battery of light sensing portion 1' with which lighting power served as the power feed zone falls, it becomes small, and when there is much light-receiving quantity of light to which the output voltage of light sensing portion 1' rises conversely, the lighting system which becomes large and has the light-receiving quantity of light of sunlight and correlation can be realized.
(Operation gestalt 8) Drawing 12 shows this operation gestalt, this operation gestalt is what formed the low frequency passage filter (for example, filter which consists of in TAKUTA, a capacitor, etc.) 21 in the output of light sensing portion 1' which served as the power feed zone of the operation gestalt 7, and the power control section 2, the lighting device 4, and the lighting

load 5 have the same composition as an example 7 so that it may illustrate.
[0074] It **, and clouds carry out smooth [of the fluctuation of the output voltage of the rapid solar battery resulting from interrupting the sun etc.], and can be prevented from getting across to the power control section 2 and a lighting device 4 with this operation gestalt by forming the low frequency passage filter 21 in the output stage of light sensing portion 1' which consists of a solar battery. That is, according to this operation gestalt, it is the lighting system which has outdoor daylight and correlation, and the lighting system which responsibility is late, carried out and moreover coped with it to change of the transient light-receiving quantity of light can be realized.
[0075] In addition, since actuation of other configurations is the same as the operation gestalt 7, explanation is omitted. By the way, what is necessary is just to install a light-receiving side so that a sunrise direction may be turned to although reference is not made especially by explanation of each operation gestalt about the direction of the light-receiving side of the light sensing portion 1 in the above-mentioned operation gestalten 1-6, or light-receiving Men of light sensing portion 1' who consists of a solar battery in the operation gestalten 7 and 8. What is necessary is just to set a light-receiving side as the Higashikata ** in a simple example. Moreover, what is necessary is just to control light-receiving Men's sense to suit sunrise bearing expected by the season with a calender when the difference of sunrise bearing is remarkable.
[0076] Thus, the example which graph-ized the indoor illuminance obtained serially is shown in drawing 13 . Desirably, if it seems that indoor illuminance maximum serves as 1000-5000lx, it is convenient for biorhythm adjustment. In addition, the axis of ordinate of drawing 13 shows the ratio of the lighting power at the time of making lighting power at the time of an all-points LGT into 100%. The following operation gestalt 9 establishes the means for following the light-receiving side of the above-mentioned light sensing portion 1 automatically by the sun.
[0077] (An operation gestalt 9) The judgment section 26 adds at least in the method of the sun which gives in a control signal to the light-receiving side moving part 25 which consists of a control section which controls rotation of the motor for drawing 14 showing this operation gestalt and this operation gestalt considering the same configuration as the operation gestalt 1 as a basic configuration fundamentally, and carrying out movable [of the light sensing portion 1] so that the light-receiving side of a light sensing portion 1 may be fit for this basic configuration in a solar direction, and a motor, and light-receiving side moving part 25.
[0078] Next, actuation of this operation gestalt is explained in full detail. the output voltage of a light sensing portion 1 inputs at least the method of the sun into the noninverting input edge of the differential amplifier section 27 in the judgment section 26 first -- it both inputs into a sample hold circuit 28. A sample hold circuit 28 holds the output voltage of a light sensing portion 1, and has inputted the output into the reversal input edge of the differential amplifier section 27. The output of the differential amplifier section 27 outputs the output voltage of the current light sensing portion 1, and the output voltage difference of the light sensing portion 1 which carried out sample hold before, and the light-receiving side moving part 25 drives a motor to the location where this output voltage difference serves as max. That is, the light-receiving side of a light sensing portion 1 can be made to follow a solar direction to the location as for which the light-receiving side of a light sensing portion 1 carries out a right pair to the sun.
[0079] In addition, since actuation of configurations other than solar flattery is the same as the operation gestalt 1, explanation is omitted. Moreover, since what is necessary is just to use a means well-known as a movable device of a light sensing portion 1, the illustration about structure and explanation are omitted here.
(Operation gestalt 10) Drawing 15 shows this operation gestalt, and gets down, and this operation gestalt has the description in the point turned in the lantern-light 30 direction which formed the light sensing portion 1 indoors so that it might illustrate, and established the light-receiving side in the building 29. That is, since it stops having correlation with the illuminance of the lantern-light 30 neighborhood when the direction where the light-receiving sides of a light sensing portion 1 differ in a lantern light 30 is turned to, the lighting system which has the neighboring illuminance of a lantern light 30 and correlation is realizable by turning the light-receiving side of a light sensing portion 1 in the direction of a lantern light 30 like this operation

gestalt.
[0080] In addition, since other configurations are the same as the operation gestalt 1 and the actuation is the same as the operation gestalt 1, explanation is omitted.
(Operation gestalt 11) Drawing 16 shows this operation gestalt, and this operation gestalt consists of the power feed zone 3, a lighting device 4, a lighting load 5, and a power control section 31, and has the description in the power control section 31 so that it may illustrate. In addition, the power feed zone 3, a lighting device 4, and the lighting load 5 are the same configurations as the operation gestalt 1.
[0081] That is, the calender timer 32 which clocks a current date to the power control section 31, The timer 33 which clocks current time, and the modulated light data time series database 34, The current time data of the calender timer 32 and a timer 33 are incorporated. The modulated light data operation part 35 which creates the modulated light data given to a lighting device 4 so that the illuminance which read the outdoor daylight data corresponding to that time data from the modulated light data time series database 34, and gave correlation from this outdoor daylight data may be obtained, It consists of the modulated light data output sections 36 which output the control signal of the width of face corresponding to the control data given from the modulated light data operation part 35 to a lighting device 4.
[0082] As a modulated light data time series database 34, here on what [month / what] in the data table which described what kind of brightness outdoor daylight (sunlight) would serve as when in how many minutes based on known measurement data etc. Or it consists of a data table which described the sunrise for every day, and the outdoor daylight data of sunset time of day and the pattern data of brightness change of outdoor daylight beforehand average [from sunrise to sunset]. In the case of the former, the modulated light data operation part 35 uses the data read as it was, and asks for the outdoor daylight data of current time by reading both data in the case of the latter, and performing the operation (multiplication) based on both data.
[0083] It **, and with this operation gestalt, based on the outdoor daylight data of the current time obtained from the modulated light data time series database 34, the power control section 31 generates the control signal for the modulated light at the time, and gives to a lighting device 4. In this case, the modulated light data operation part 35 creates control data so that a lighting control pattern which serves as an illuminance higher than the average illumination of the morning or an afternoon at least in the account illuminance of predetermined period Nakamae before and behind noon may be obtained.
[0084] Although many things are considered about a lighting control pattern here, with this operation gestalt, it adopts [for the purpose of following lighting control Batang]. That is, as a lighting control pattern, as shown in drawing 17 (a), apply to noon from sunrise and an illuminance is raised linearly. The fundamental pattern according to natural light change to which an illuminance is linearly reduced from noon to sunset, Furthermore, as shown in drawing 17 (b), the account illuminance of predetermined period Nakamae before and behind noon is made into a fixed illuminance higher than the average illumination of the morning or an afternoon. As shown in the pattern which aimed at maintenance of the vigilance by the bright light of daytime, and improvement, and drawing 17 (c), after sunset based on the pattern of drawing 17 (b) as a fixed illuminance The break period which made the illuminance low is set up at the pattern it is made not to cause trouble to the actual activity after sunset, and also the stage when the fall of the vigilance of past noon occurs based on Batang of drawing 17 (c) as shown in drawing 17 (d). subsequent working efficiency is shown in the pattern and drawing 17 (e) which are raised more -- as -- a change linear based on the pattern of drawing 17 (c) -- a logarithm -- it changes into change of-like and there is a pattern brought more close to natural light change.
[0085] Furthermore, as shown in drawing 18 (a), drop an illuminance with constant speed from near noon to the predetermined time of day in front of sunset, and an after that predetermined illuminance is maintained. The pattern with which it was made for the light of ante-meridian to become effective in adjustment of biorhythm, and recovery maintenance of day ranges, Moreover, as shown in drawing 18 (b), while aiming at [the illuminance climbing speed of ante-meridian] the effectiveness of drawing 18 (a) for the lowering speed of the illuminance of an afternoon as smallness in size based on the pattern of drawing 18 (a) The pattern which made

recovery maintenance easy to carry out, the pattern which made recovery maintenance easier to give fluctuation of an illuminance at the fixed illuminance period of the pattern of drawing 18 (b), and to carry out as shown in drawing 18 (c) further again, Moreover, there is a pattern which makes a climbing speed sudden for a lowering speed gently in the part [drawing 18 / (c)] of fluctuation as shown in drawing 18 (d), and confirms improvement in vigilance more. In this case, the direction periodically made more into random as a fluctuation part was shown in drawing 18 (e) becomes [adaptation] few effective by vigilance maintenance.

[0086] Moreover, in the lighting of a workplace, there is a pattern which shows commencement-of-work time of day to drawing 19 (a) thru/or drawing 19 (d) made into the starting point. In this case, the pattern and drawing 19 (c) which drawing 19 (a) maintained during the morning uniformly with the high illuminance, and the pattern to which the afternoon changed the illuminance in proportion to outdoor daylight, and drawing 19 (b) gave width of face to fixed illuminance time amount, and set up the rest period, and (d) are the turns which used the pattern of drawing 17 (a) and drawing 18 (a) as the model.

[0087] The pattern which became possible [setting up the lighting control pattern of arbitration], and fitted the location to illuminate, and the pattern in consideration of biorhythm can be realized without **(ing), and actually receiving sunlight according to this operation gestalt. When daylight-hours bands differ in **** and winter, it is not necessarily good to reproduce change of the natural light faithfully. It may be made to set the date change by the summer solstice or winter solstice a core [the vernal equinox and the autumnal equinox] to one half, using output width of face of the calender timer 33 of the power control section 31 as one half there.

[0088] Or you may make it take out the sunrise of the modulated light data time series database 34, and the data of sunset time of day per two days. furthermore, a lighting user's favorite season is set up and you may make it output the lighting control pattern which boils the illuminance change according to the season, and corresponds

(Operation gestalt 12) the configuration which controls the lighting power of basic lighting load 5a attached in head lining etc. through the lighting device 4 with the control signal of the power control section 31 used with the operation gestalt 11 so that drawing 20 may show this operation gestalt and this operation gestalt might be illustrated -- in addition It has composition which controls the lighting power of task lighting load 5b, such as a personal desk stand, and a personal spotlight, down RAIDO, by the control signal of the power control section 39 through a lighting device 40. According to the width of face of the control signal which a lighting device 40 is the thing of the same configuration as a lighting device 4, and is outputted from the power control section 39, the lighting power of lighting load 5b can be controlled, adjustable [of the illuminance of the lighting region of task lighting load 5b] can be carried out, and lighting power is supplied through ON/OFF control section 38 here from the power feed zone 3. It turns on/turns off by the distinction signal of the distinction section 42 which distinguishes ON / off important point of task lighting, and needlessness based on the detection output of the taking-a-seat situation detecting element 41 which detects taking-a-seat situations, such as a selection signal of task lighting ON / off manual selection section 37, or a desk, the power from the power feed zone 3 is supplied to a lighting device 40 at the time of ON, and ON / off control section 38 intercepts at the time of OFF. Switch SW0 It is a switch for making change-over selection of the signal linked to ON / off control section 38 from the selection signal of task lighting ON / off manual selection section 37, and the distinction signal of the distinction section 42.

[0089] The modulated light data operation output section 46 to which the power control section 39 made one the modulated light data operation part and the modulated light data output section in the power control section 31 of an example 14, The database 45 which stores the lighting control pattern of vigilance maintenance, The individual humanity news which uses task lighting, and the input section 43 for personal pattern selection, Consist of a timer 44 which clocks current time, and the modulated light data operation output section 46 reads the modulated light data which correspond based on the current time data from a timer 44 with a database 45. Based on individual humanity news or the contents of personal pattern selection, the control signal of predetermined modulated light level is generated, and this data is outputted.

[0090] Since the power control section 31 of a **** operation gestalt is the same as the power control section 31 of an example 11, the explanation about a configuration and actuation is omitted. while it ** and the control signal from the power control section 31 performs illumination control of basic lighting load 5a of the whole interior of a room like the operation gestalt 11 in the case of this operation gestalt -- taking-a-seat condition -- or it can carry out to the control signal outputted from the power control section 39 by lighting control pattern to which maintenance of vigilance is given to and illumination control of personal task lighting load 5b is made as for things if needed.
[0091] As a **** operation gestalt shows to drawing 21 (a), with the lighting by basic lighting load 5a The basic illuminance which maintains a fixed illuminance and is kept constant from sunset with a still lower illuminance from sunrise to sunset is obtained. By obtaining the illuminance which correlated control of the lighting power of task lighting load 5b with change of outdoor daylight (sunlight) as shown in drawing 21 (b), lighting with the illuminance change with outdoor daylight and correlation can be performed. In this case, since lighting which gave illuminance change correlated with change of outdoor daylight can be performed upwards for every individual and the illuminance by basic lighting load 5a can be made low, power consumption can be lessened.
[0092] Moreover, as shown in drawing 21 (c), with the lighting by basic lighting load 5a, illuminance change is obtained so that it may become the pattern of drawing 17 (d) from sunrise to sunset, and control which gives fluctuation as shown in drawing 21 (d) also becomes possible with this operation gestalt about control of the lighting power of task lighting load 5b. Control of a task lighting load is possible also for control called drawing 21 (d) at that it is drawing 21 (b) and (it being equivalent to drawing 17 (b)), and illuminance change of a basic lighting load can reproduce the illuminance change on the 1st roughly with basic lighting, and can make a recovery maintenance pattern superimpose with task lighting.
[0093] In addition, the lighting loads shown by the above-mentioned operation gestalt 1 thru/or 12 may be two or more lamps, or may be 1 one lamp, and, in two or more cases, a multi-LGT lighting device is used as a lighting device. Moreover, when putting side by side two or more lighting devices, a power control section and the power output section may be shared.
(Operation gestalt 13) This operation gestalt starts the lighting system suitable for the place where a lighting user slack operator's work site is being fixed, for example, a work room, (office), the workplace where works are being fixed, the monitor room where the direction and the monitoring station of the object to supervise are being fixed.
[0094] Drawing 22 shows the configuration of this operation gestalt. The lighting system of this operation gestalt In order to give the lighting device 52 the general lighting instrument 49 equipped with the light source used as the basic lighting load installed in order to secure a necessary minimum illuminance, and for general lighting instrument 49, and the illuminance needed for the lighting user M Local lighting instrument 50a-- equipped with the task lighting load slack light source which is installed one or more pieces if needed, and irradiates the inside of the lighting user's M visual field, such as a downlight and a spotlight, Lighting-device 51a-- equipped with the modulated light function corresponding to each local lighting instrument 50a--, The control section 54 which gives the control data which carries out modulated light control so that it may become quantity of light change which mentions each local lighting instrument 50a-- later to each point LGT equipment 51a--, It consists of the quantity of light change information generating section 56 which generates the quantity of light change information for creating control data by the control section 54, and a power-source slack power feed zone 55, and arranges in the head-lining section 53 including each lighting fitting 49 and 50a--.
[0095] Drawing 23 shows the circuitry of this operation gestalt. The quantity of light change information generating section 56 Based on time of day, modulated light data are called from a modulated light data time series database like the operation gestalt 11. the time check of a timer or a calender timer -- quantity of light change information being generated, or Or it is the thing equipped with the function to generate quantity of light change information based on the detection information on the sensor which detects the brightness of outdoor daylight. Transition of change of the quantity of light of sunlight and the quantity of light change information that it

corresponds are given to a control section 54, and a control section 54 creates the modulated light data based on the quantity of light change information from this quantity of light change information generating section 56 as control data, and gives them to lighting-device 51a--. In this case, the modulated light data created are local lighting instrument 50a so that the illuminance of the lighting region irradiated by local lighting instrument 50a-- so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset may be changed and it may become a high illuminance from the average illumination of the morning or an afternoon at least about the account illuminance of predetermined period Nakamae before and behind noon. -- It is set up so that light source La-- for local lighting may be controlled.

[0096] Moreover, a control section 54 supplies the power from the power-source slack power feed zone 55 to each local lighting instrument 50a-- through each point LGT equipment 51a--. In addition, the power source corresponding to the general lighting instrument 49 is given from another power feed zone (not shown). Of course, the above-mentioned power feed zone 55 may be shared. lighting-device 51a-- performs lighting/putting out lights based on the control data from a control section 54 by actuation of switch SWa-- for local lighting to light source La[of local lighting instrument 50a--] -- which boils, respectively and has been prepared while controlling lighting power and modulating the light.

[0097] When the desk 57 grade in which it ** and the operator slack lighting user M works with this operation gestalt must be most illuminated with a low illuminance When it illuminates only with the general lighting instrument 49 and the lighting user M needs an illuminance higher than it By turning on switch SWa-- for local lighting prepared in each corresponding local lighting instrument 50a-- Add the lighting by local lighting instrument 50a--, such as a downlight and a spotlight, to the lighting of the general lighting instrument 49, and the illuminance by the local lighting instrument 50a-- concerned by controlling by the control section 54 It can be set as the illuminance which needs the illuminance of the lighting region (inside of the lighting user's M visual field) by local lighting instrument 50a--. While changing this illuminance here so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset, lighting which suited the lighting user's M biorhythm like each above-mentioned operation gestalt can be performed by changing the account illuminance of predetermined period Nakamae before and behind noon at least, so that it may become an illuminance higher than the average illumination of the morning or an afternoon. In addition, although local lighting instrument 50a-- is arranged in the head-lining section 53 with the configuration of drawing 22 , you may install in the partition 59 with which the desks 57 and 57 which face as shown in drawing 24 are divided. However, local lighting instrument 50a-- is the light source La about the panel 58 of an optical diffusion mold in this case. -- Reality is accepted by carrying out attaching in a front face etc., and it is made not to be unpleasant glare. the component which has drawing 22 and the same role as the component of drawing 23 since the role of the circuitry in the example of drawing 24 and the general lighting instrument 49 is the same as that of **** -- being alike -- the same number and a notation are attached and explanation is omitted. In addition, the power-source slack power feed zone 55 is formed respectively corresponding to the lighting device 52 for general lighting, and the lighting devices 51a and 51b for local lighting.

[0098] Furthermore, although above-mentioned local lighting instrument 50a-- was a configuration arranged to the head-lining section 53 or party SHON 59, it may constitute the local lighting instrument 50 from an instrument of the stand mold laid on a desk 57 as shown in drawing 25 thru/or drawing 27 again. While changing the brightness within the lighting user's M visual field (illuminance) also in this case so that it may correspond as mentioned above with transition of change of the quantity of light of the sunlight from sunrise to sunset It is the same as the example of drawing 22 (drawing 23) and drawing 24 that it is natural and in circuitry to perform modulated light control to the local lighting instrument 50 so that the account illuminance of predetermined period Nakamae before and behind noon may be made into an illuminance higher than the average illumination of the morning or an afternoon at least.

[0099] However, as shown in drawing 26 , even if attaching in the front face of the light source L etc. accepts reality by carrying out panel 58' of a transparency diffusion mold in this case, it is

made not to be unpleasant glare. In addition, 60 in drawing 26 is the case of an instrument, and 61 is a reflecting plate. Moreover, lighting fitting which has the configuration of a functional change-over so that it can be used also for the usual stand, as shown in drawing 28 (a) thru/or (c), and drawing 29 (d) as a local lighting instrument 50 may be used.

[0100] Lighting fitting to illustrate puts the panel 58 of a diffusion mold on front opening, and has structure supported pivotably free [bending forward] by the pivot 109 which prepared the front lower-limit both sides of the box-like stand section case 101 which contained a reflecting plate 100 and the light source L in the interior in the kickback edge both sides of susceptor 102, and the stand section case 101 and susceptor 102 have contained to the receipt crevice 103 as for which the front face of formation **** and the top face carried out opening to the partition 59 mentioned above. The projection 104 for a guide formed in the vertical location of the posterior part of the both-sides side face of the stand section case 101 here, It inserts in free [vertical migration] in the guide crevice 106 of the vertical direction which formed both projections 104 and the projection 105 for a guide prepared in the both-sides side face of the susceptor 102 on the same line in the posterior part of the both-sides internal surface of the receipt crevice 103. Moreover, it has inserted in the guide crevice 108 which formed the projection 107 for a guide prepared in the anterior part of the both-sides side face of susceptor 102 in the anterior part of the both-sides internal surface of the receipt crevice 103 so that it might be concurrent with the guide crevice 106 free [vertical actuation].

[0101] In **(ing) and using lighting fitting as a local lighting instrument 50 in this invention lighting system, as shown in drawing 29 (a), the lower limit location of the guide crevices 106 and 108 has the projections 104, 107, and 108 for a guide of the both-sides side face of susceptor 102, and it sets to the condition that the stand section case 101 was contained in the receipt crevice 103, and the stand section case 101 was ****(ed) on susceptor 102. In this case, the light which comes out of the light source L irradiates the front of a partition 59 through a panel 58.

[0102] Next, when using it as usual stand lighting, it is made to move to the location (drawing 29 (b)) where the guide projections 104 and 104 escape from upper limit opening of the guide crevice 106 up, it comes out, and the projection 107 for a guide collides with the upper limit of the guide crevice 108 the condition shown in drawing 29 (a) to the stand section case 101. As the SUNTANDO case 101 is counterclockwise rotated in drawing focusing on a pivot 109 from this condition and it is shown in drawing 29 (c), the SUNTANDO case 101 is bent forward and it considers as a condition. The front-face section of a lower limit of the stand section case 101 which serves as the back end inferior-surface-of-tongue section in drawing 29 (c) here will be ****(ed) and supported on the susceptor 110 which is making it project ahead from front opening of the receipt crevice 103 with the top face which turns into a top face of the above-mentioned susceptor 102, and the same Men.

[0103] If the projection 105,107 for a guide of susceptor 102 moves the stand section case 101 downward to the lower limit location of the guide crevice 106,108 in this condition, the stand where the lighting direction serves as facing down (the direction of a desk top face) will be constituted.

This operation gestalt is set to the system configuration of drawing 22 of the operation gestalt 13. (Operation gestalt 14) It is the system which added feeling sensor section of man 62a-- which consists of a heat ray sensor which can recognize existence of the lighting user M as shown in drawing 30 . Many lighting users M exist in the room, and the lighting user's M work site is being fixed. The lighting user M does not frequently use the location, and it is made suitable for a workplace, a work room (office), etc. where the timing when not considering as the time of using it by the lighting user M differs.

[0104] Drawing 31 shows the circuitry of this operation gestalt, and feeling sensor section of man 62a-- which consists of a heat ray sensor etc. that there is the lighting user M near [within the visual field which local lighting instrument 50a-- is going to irradiate] detects. Modulated light control action is performed to local lighting instrument 50a-- to which lighting-device 51a-- (or control section 54) of local lighting instrument 50a-- which corresponds the detection signal which was sent to lighting-device 51a-- (or control section 54), and received the signal

corresponds. That is, when a detection signal is sent to lighting-device 51a--, the control data from a control section 54 is confirmed, and the lighting-device 51a-- concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting-device 51a-- concerned which received delivery and this control data for the control data performs modulated light control to lighting-device 51a-- to which a control section 54 corresponds to corresponding local lighting instrument 50a--.
[0105] In addition, the same number and a notation are given to the component which succeeds to drawing 22 and drawing 23 in the same configuration and the same actuation fundamentally in the component shown in drawing 30 and drawing 31 , and explanation is omitted. Moreover, especially the power-source slack power feed zone corresponding to the general lighting instrument 49 and a lighting device 52 does not illustrate, but is omitted. While making it change so that it may ** and the brightness within the lighting user's M visual field (illuminance) may be corresponded as mentioned above like [modulated light control of this operation gestalt] the operation gestalt 13 with transition of change of the quantity of light of the sunlight from sunrise to sunset At least, modulated light control of the account illuminance of predetermined period Nakamae before and behind noon is carried out so that it may become an illuminance higher than the average illumination of the morning or an afternoon, and lighting which suited the lighting user's M biorhythm is performed.
[0106] Moreover, according to this operation gestalt, only the inside of the visual field of the lighting user M who is working can perform lighting by local lighting instrument 50a--.
(Operation gestalt 15) this operation gestalt adds feeling sensor section of man 62a-- which can recognize existence of the lighting user M as shown in drawing 32 and drawing 33 to each local lighting instrument 50a-- of every -- both It is the system of feeling sensor section of man 62a-- which prepared local lighting instrument 50a-- in which the direction-of-radiation adjustable is free based on the detection signal, and it is the the best for the activity and work room where the lighting user's M work site is not fixed, and suitable for the work room (office) which changes arrangement of a conference room and a desk etc. frequently. In addition, although drawing 32 shows only one local lighting instrument 50a, according to an installation, more than one are prepared like the above-mentioned operation gestalten 13 and 14.
[0107] Feeling sensor section of man 62a-- used with this operation gestalt consists of an image-processing sensor using CCD which can recognize existence of the lighting user M and a location etc., and as shown in drawing 33 , local lighting instrument 50a-- is equipped with the direction-of-radiation adjustable motors MT1 and MT2 for local lighting, drives them by these motors MT1 and MT2, and it consists of lighting fitting which can carry out adjustable [of the direction of radiation] freely like the after-mentioned.
[0108] The direction-of-radiation adjustable motors MT1 and MT2 for local lighting are controlled by direction-of-radiation control-section 63a-- for local lighting prepared corresponding to each. Direction-of-radiation control-section 63a-- for local lighting is local lighting instrument 50a of corresponding feeling sensor section of man 62a-- which corresponds based on the lighting user's M location detection information. -- The direction of radiation controls rotation of the direction-of-radiation adjustable motors MT1 and MT2 for local lighting to become in the lighting user's M visual field.
[0109] In addition, since other configurations are fundamentally the same as the operation gestalt 13, the same number and a notation are given to the same component as the component shown by drawing 22 and drawing 23 , and explanation is omitted. Lighting-device 51a (or control section 54) which received delivery and its detection signal performs modulated light control action to lighting-device 51of local lighting instrument 50a to which the feeling sensor section of man which **(ed) and detected lighting user M with this operation gestalt, for example, 62a, corresponds the detection signal a (or control section 54) to corresponding local lighting instrument 50a. That is, when a detection signal is sent to lighting-device 51a, the control data of the modulated light from a control section 54 is confirmed, and the lighting device concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting-device 51a concerned which received delivery and this control data for the control data performs modulated light control to lighting-device 51a to which

a control section 54 corresponds to corresponding local lighting instrument 50a.
[0110] Feeling sensor section of man 62a sends the lighting user's M detection positional information to the above-mentioned modulated light control and coincidence at direction-of-radiation control-section 55a for local lighting of local lighting instrument 50a. Direction-of-radiation control-section 55a for local lighting which received detection positional information controls rotation of the direction-of-radiation adjustable motors MT1 and MT2 for local lighting, and changes the direction of radiation of local lighting instrument 50a so that local lighting instrument 50a may illuminate the inside of the lighting user's M visual field.
[0111] As shown in drawing 34 (a) thru/or (d) as local lighting instrument 50a-- used for this operation gestalt here, lighting fitting of a downlight mold is used. The case 66 with which the top-face core is being fixed to the driving shaft 65 of a motor MT 1 so that a rotation drive may be horizontally carried out by the motor MT 1 which this lighting fitting was contained in the closed-end cylindrical external instrument attaching part 64 and this external instrument attaching part 64, and was formed in the top face of the external instrument attaching part 64, The lighting fixture 67 which has been arranged in this case 66, and has been arranged so that the end section may rotate perpendicularly with the driving shaft (not shown) of Motor MTb, It becomes the reflecting plate 68 arranged inside the other end of this lighting fixture 67 from the light source L, and the power-source line 69 of motors MT1 and MT2 is connected at corresponding direction-of-radiation control-section 55a-- for local lighting, and the power-source line 70 from the light source L is connected to corresponding lighting-device 51a--.
[0112] Direction-of-radiation control-section 55a for local lighting which **(ed) and received the above-mentioned feeling sensor section of a man, for example, the detection positional information from 62a While rotating the direction of an arrow head which performs the roll control of a motor MT 1 and shows a case 66 to drawing 34 (b), i.e., a horizontal direction, and making the location of a lighting fixture 67 correspond in the lighting user's M existence direction The roll control of a motor MT 2 is performed, the direction of an arrow head which shows a lighting fixture 67 to drawing 34 (d), i.e., a perpendicular direction, is rotated, and an adjustable setup of the illuminating angle of a reflecting plate 68 and the light source La is carried out so that the inside of the lighting user's M visual field may be irradiated.
[0113] It is local lighting instrument 50a so that only the inside of the lighting user's M visual field may be irradiated with this operation gestalt as mentioned above by the positional information of the lighting user M who is working. -- Since the direction of radiation is changed automatically Even if the person M for Akitoshi is working in a different location from before, while making it change so that it may correspond with transition of the change of the quantity of light of the sunlight from sunrise to sunset by the brightness within the lighting user's M visual field (illuminance) The account illuminance of predetermined period Nakamae before and behind noon is controllable at least to become an illuminance higher than the average illumination of the morning or an afternoon.
[0114] (Operation gestalt 16) With the above-mentioned operation gestalt 15, it is based on the lighting user's M positional information which feeling sensor section of man 62a-- detected, and is local lighting instrument 50a. -- Although he was trying to control the direction of radiation With this operation gestalt, remote control signal light sensing portion 72a-- which is the receiving means which attached the remote control signal transmitted from the remote control transmitter 71 which the lighting user M has as shown in drawing 35 , and which used light, such as infrared radiation, as a signal medium to local lighting instrument 50a-- as shown in drawing 36 , for example receives light. The direction of radiation is set up for every send channel, that is, the send channel has been direction-of-radiation information, and a remote control signal is sent to direction-of-radiation control-section 63a-- for local lighting which judges the direction of radiation according to the channel of the remote control signal which received light, and corresponds the information on the direction of radiation by remote control signal light sensing portion 72a-- here. Therefore, arrangement of the activity and work room where the lighting user's M work site is not fixed like the operation gestalt 15, a conference room, and a desk etc. is suitable for the work room (office) which changes frequently. If the operating button of the transmission channel which corresponded so that it might ** and the lighting user M might

become in his visual field about the direction of radiation of a local lighting instrument with this operation gestalt is operated, for example, a remote control signal is transmitted toward local lighting instrument 50a The signal which shows that remote control signal light sensing portion 72of local lighting instrument 50a a had light-receiving of a remote control signal to corresponding lighting-device 51a (or control section 54) Delivery, Lighting-device 51a (or control section 54) which received the signal performs modulated light control action to corresponding local lighting instrument 50a. That is, when a detection signal is sent to lighting-device 51a--, the control data of the modulated light from a control section 54 is confirmed, and the lighting device concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting device concerned which received delivery and this control data for the control data to lighting-device 51a-- corresponding to local lighting instrument 50a to which a control section 54 corresponds performs modulated light control.

[0115] Remote control signal light sensing portion 72a the direction-of-radiation information judged from the receiving channel to direction-of-radiation control-section 55a for local lighting of local lighting instrument 50a corresponding to the above-mentioned modulated light control and coincidence Delivery, Direction-of-radiation control-section 55a for local lighting controls rotation of motors MT1 and MT2, and changes the direction of radiation of local lighting instrument 50a so that it may irradiate with the illuminance needed in the lighting user's M visual field based on the direction-of-radiation information from remote control signal light sensing portion 72a.

[0116] Lighting fitting of the downlight mold shown in drawing 37 (a) which has the same configuration as the configuration of drawing 34 substantially as local lighting instrument 50a-- used with a **** operation gestalt thru/or (d) is used. A point which is different from local lighting instrument 50a-- of this operation gestalt with local lighting instrument 50a-- of drawing 34 here is a point of having formed the remote control light sensing portion 72 in the case 66, and it is drawn outside from the upper part of the external instrument attaching part 64 so that the signal line 73 from this remote control light sensing portion 72 may be sent to the corresponding direction-of-radiation control section 63 for local lighting. In addition, since other configurations are the same as the configuration of drawing 34 , the same number and a notation are given to the same component, and explanation is omitted.

[0117] Direction-of-radiation control-section 55a-- for local lighting which **(ed) and received direction-of-radiation information from remote control signal light sensing portion 54a-- performs the roll control of motors MT1 and MT2, and carries out an adjustable setup of the sense and illuminating angle of a lighting fixture 67 like the case of an example 15. As mentioned above, with this operation gestalt, the direction of radiation is chosen for lighting user M itself so that only the inside of the visual field of the lighting user M who is working may be irradiated. By [of local lighting instrument 50a--] changing the direction of radiation Even if the lighting user M is working in a different location from before, while making it change so that it may correspond with transition of the change of the quantity of light of the sunlight from sunrise to sunset by the brightness within the lighting user's M visual field (illuminance) At least, the account illuminance of predetermined period Nakamae before and behind noon can be set up so that it may become an illuminance higher than the average illumination of the morning or an afternoon.

[0118] In addition, although the information transmitted from the remote control transmitter 71 with the above-mentioned configuration was direction-of-radiation information which shows the direction of radiation set up beforehand, if it is made to send from the remote control transmitter 71 by making into direction-of-radiation information the actuation signal of local lighting instrument 50a-- which operates a motion by remote control using actuation means, such as Joyce TEIIKU, the direction of radiation can be set up in the optimal direction by the own actuation of lighting user M.

(Operation gestalt 17) So that it may be in an active state immediately, after it uses this operation gestalt after getting up in the morning before going out for the purpose, such as work, and going out space, such as a washroom where it is required that human being who uses should be awoke, a dining room, and the door, -- or it carries out hypnagogic, by the time it carries out

It is a lighting system suitable for the lighting for residences, such as space demanded, that being relaxed by human being who uses adjusts [for the purpose of the biorhythm of those who use / living room / which is demanded].

[0119] The lighting device 51 equipped with the function which carries out modulated light control of one or more lighting fitting 80 and these lighting fitting 80 which can irradiate the inside of the visual field of the lighting user M installed in the washroom 74 as the lighting system of this operation gestalt was shown in drawing 38 , It consists of a sensor which detects the timer for creating the data to which the quantity of light of a luminaire 80 is changed so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset, or the brightness of outdoor daylight. It consists of the quantity of light change information generating section 56 which outputs quantity of light change information [**** / transition / of change of the quantity of light of sunlight], a control section 54 which creates modulated light data in response to quantity of light change information, and is sent to a lighting device 51 as control data, and a power feed zone 55.

[0120] With this operation gestalt, if the lighting switch SW is turned on, a control section 54 will irradiate the visual field of human being who performs modulated light control and uses control data so that the quantity of light of lighting fitting 80 may turn into the target quantity of light based on the control data in delivery and a lighting device 51 by the illumination light of lighting fitting 80 at a lighting device 51 based on the quantity of light change information acquired from the quantity of light change information generating section 56. However, the lighting fitting 80 of this operation gestalt has covered the light source by the opaque white panel which diffuses light so that an unpleasant glare may not be sensed in the condition of irradiating the maximum quantity of light, even if it faces lighting fitting 80 squarely.

[0121] Usually, since a washroom 74 is located in the location into which daylight cannot go easily in a house, such the sufficient quantity of light does not have it that recovery level is raised. Therefore, even if it went into the washroom 74 for washing a face, preparing hair, etc., the present condition was that recovery level is not mostly different from the condition after occurring. however, in the lighting system of this operation gestalt in this washroom 74 For example, the quantity of light of the target lighting fitting 80 is changed by quantity of light change of outdoor daylight, and quantity of light change which gave correlation. for example, after getting up in the morning, when actions, such as washing a face in a washroom 74 and preparing hair, are done Since it occurs by carrying out modulated light control of the lighting fitting 8, and irradiating the lighting user's M visual field and there is also no between so that it may become the quantity of light which gives an arousal effect, even if it is in the condition that recovery level has fallen, it can be made to be able to awake, and the effectiveness of gathering future activity effectiveness can be given to the lighting user M.

[0122] on the other hand, when doing actions, such as going home and washing a hand in a washroom 74, and gargling By carrying out modulated light control so that the quantity of light of a luminaire 80 may be irradiated on low illuminance level compared with a morning or day ranges That there is no excessive arousal effect **** which is not needed at the time of going home which does not give dazzle to the eye which has adapted itself to dark conditions, such as walking the dark inside at the time of sunset, and going home, etc. can lower the vigilance of those who use before hypnagogic, after going home, and it can bring it to the relaxation condition desired before hypnagogic. [it]

[0123] Moreover, the biorhythm of those who use by changing the quantity of light of lighting fitting by the quantity of light change at the time of the night which lowers vigilance can adjust in the morning which goes home a morning quantity of light change which a night shift etc. raises vigilance to the time amount to which the usual man is sleeping, and raises vigilance at the night at the time of going out of bringing to an active state going to a station to those who are demanded so that it may work at night.

[0124] As stated above, by the lighting system of this operation gestalt, the lighting user's M biorhythm can be adjusted by performing quantity of light change according to the purpose so that the target biorhythm may be suited.

(Operation gestalt 18) The lighting system of this operation gestalt The feeling sensor section 62

of a man which senses existence of the lighting user M as shown in drawing 39 is added. The detection information on whether the lighting user M outputted from the feeling sensor section 62 of a man exists is received. Based on the detection information, when the lighting user M exists, it is what formed the control section 54 equipped with the function to make the target lighting fitting 80 turn on by the lighting device 51 with a modulated light function, for example, it is installed in the door 75.

[0125] If the feeling sensor sections 62 of a man, such as infrared sensing, detect the thing to which Man M exists in the exposure field of the lighting fitting 80 which it **(ed) and was installed in the door 75 with this operation gestalt and to exist A control section 54 receives the detection information, and when detected as Man M existing, based on the quantity of light change information acquired from the quantity of light change information generating section 56 constituted like the operation gestalt 15, a control section 54 creates control data and sends it to a lighting device 51. Based on the control data which the lighting device 51 received, modulated light control of the lighting fitting 80 is carried out, and the lighting user's M visual field is made to irradiate with the target quantity of light. When detected as on the other hand the lighting user M not existing, the lighting device 54 from which the control section 54 received delivery and the signal of the putting out lights for the signal of putting out lights to the lighting device 51 makes lighting fitting 80 switch off.

[0126] since [by the way,] the door 75 is usually located in the location into which daylight cannot go easily in a house -- recovery level -- raising -- ** -- even if sufficient quantity of light went into the door 75 for . which is not, therefore morning going out, recovery level was not able to expect the rise. However, the quantity of light change information that quantity of light change and correlation of outdoor daylight were given in the lighting system by this operation gestalt is given to a control section 54 from the quantity of light change information generating section 56. When the lighting user M exists in the door 75 in the morning for going out By irradiating the visual field of those M who do modulated light control and use the quantity of light of the target lighting fitting 80 so that it may become the quantity of light which gives an arousal effect Since it occurs and there is also no between, the lighting user M in the condition that recovery level has fallen can be awoke, and the effectiveness of gathering the activity effectiveness after going out can be given to a lighting user.

[0127] When going home and going into the door from outside, the quantity of light on the other hand, by carrying out modulated light control of the lighting fitting 80 so that it may irradiate on low illuminance level compared with a morning or day ranges It can lower the lighting user's M vigilance to before hypnagogic that there is no excessive arousal effect **** which is not needed at the time of going home which does not give glare to the eye which has adapted itself to dark conditions, such as to walk the dark inside at the time of sunset, and to go home, etc., after going home, and it can bring it to the condition that it is wished before hypnagogic and that it can relax. [it]

[0128] In addition, 55 are a power-source slack power feed zone among drawing 39 .

(Operation gestalt 19) The lighting system of this operation gestalt The general lighting instrument 49 hung from the head-lining section 53 which can be irradiated with the quantity of light more than the minimum quantity of light in the quantity of light needed as shown in drawing 40 , It is prepared on a table 76, consists of local lighting instruments 50 which can irradiate the lighting user M by quantity of light change of outdoor daylight, and quantity of light change which gave correlation, and applies to a dining room (table) 77.

[0129] When it ** and must illuminate with the minimum quantity of light with this operation gestalt, it illuminates only with the general lighting instrument 49. Switch SW0 It is the lighting switch of this general lighting instrument 49, and is this switch SW0. When turned on, a lighting device 52 makes the general lighting instrument 49 turn on with the power from power-source slack power feed zone 55'. When an illuminance higher than it is needed, the control section 54 of the local lighting instrument 50 which consists of a stand etc. Based on the quantity of light change information received from the quantity of light change information generating section 56 constituted like the above-mentioned operation gestalten 17 and 18 The control data for changing the quantity of light of the local lighting instrument 50 by quantity of light change of

outdoor daylight and quantity of light change which gave correlation is outputted. The lighting device 51 for local lighting which received the control data carries out modulated light control of the local lighting instrument 50 in response to the power from the power feed zone 55 which is a power source so that it may become the quantity of light according to the control data.
[0130] And the inside of the target lighting user's M visual field is illuminated with the quantity of light to need by adding lighting with this local lighting instrument 50 by which modulated light control was carried out. By making the lighting user's M visual field irradiate with the quantity of light which quantity of light change and correlation of outdoor daylight are given, and the quantity of light of the local lighting instrument 50 is changed with this operation gestalt, for example, gives an arousal effect here at the time of breakfast Since it occurs and there is also no between, the man in the condition that recovery level has fallen can be awoke, and the effectiveness of gathering future activity effectiveness can be given to the lighting user M. On the other hand, at the time of the supper after going home, the lighting condition that a meal can be taken in the relaxed condition of being wished at the time of supper can be presented at the time of going home by reducing the quantity of light of the local lighting instrument 50, and making it irradiate on low illuminance level compared with a morning or daytime, such as not giving the excessive arousal effect which is not needed.
[0131] In addition, even if the local lighting instrument 50 covers the light source by the opaque white panel of diffusibility etc. and faces the local lighting instrument 50 squarely, it is made to have not sensed an unpleasant glare.
(Operation gestalt 20) Although each above-mentioned operation gestalt started the lighting system in buildings, such as a building and a residence The high speed bus and sleeping car as for which this operation gestalt runs at Nighttime which reaches the purpose value in the early morning, The lighting system suitable for the vehicle which will work [rises and] and sleep at time of day which is different from the usual life activities after a lighting user's using the airplane used in order to move to the large location of time difference is started, and it is made to apply to an airplane, as shown in drawing 41 .
[0132] The lighting device 51 for carrying out modulated light control of one or more lighting fitting 80 and these lighting fitting 80 which can irradiate the inside of the lighting user's M visual field by quantity of light change with this operation gestalt, It consists of the quantity of light change information generating section 56 with the same configuration as what was used for the operation gestalt 17 thru/or 19, a control section 54 which receives the quantity of light change information from this quantity of light change information generating section 56, and sends control data to a lighting device 51, and a power-source slack power feed zone 55.
[0133] With this operation gestalt, the lighting device 51 which thought delivery and its control data that a control section 54 gives quantity of light change and the correlation of outdoor daylight, and changes the quantity of light of a luminaire 80 based on the information acquired from the quantity of light change information generating section 56 for the control data to the lighting device 51 performs modulated light control so that a luminaire 80 may irradiate the lighting user's M visual field with the target quantity of light. However, the lighting fitting 80 used for this operation gestalt has covered the light source (not shown) by the opaque white panel (not shown) which diffuses light so that an unpleasant glare may not be sensed in the condition of irradiating the maximum quantity of light, even if it faces lighting fitting 80 squarely.
[0134] At the lighting system of this operation gestalt used for the lighting of this airplane inside the plane, by quantity of light change of outdoor daylight, and quantity of light change which gave correlation Even if it is a time of arriving at the location where time difference with an origin is large by changing the quantity of light of the target lighting fitting 80 The visual field of the lighting user M who uses by morning quantity of light change which gives an arousal effect when arrival time is a morning can be irradiated. Therefore, the lighting user M in the condition that recovery level has fallen for lack of sleep is awoke, and it becomes possible to give the lighting user M the effectiveness of gathering the activity effectiveness in an arrival location. conversely, activity patterns, such as rising, such as going into a hotel immediately after arrival and sleeping by lowering recovery level in night and irradiating the lighting user's M visual field by the quantity of light change at the time of night which is easy to start the activity of night, such as sleep, an

activity, and sleep, -- the usual activity pattern of an arrival location -- smooth -- shift -- last -- biorhythm can be adjusted like.
[0135] moreover, when the lighting system of this operation gestalt is applied to the vehicle which arrives at early morning which is usually sleeping, such as a high speed bus By changing the quantity of light and irradiating a lighting user so that a lighting user's recovery level may be raised to bus arrival time Usually, reach the time amount which is sleeping and the recovery level of the lighting user to whom recovery level has fallen is raised to rising and an active state. This (operation gestalt 21) operation gestalt which can adjust a lighting user's biorhythm so that it can shift to the activity after a lighting user gets down from a vehicle reasonable By that that it irradiates with the quantity of light more than the minimum quantity of light in the quantity of light needed as shown in drawing 42 It is the operation gestalt of the lighting system which consists of local lighting instrument 50a-- which consists of a spotlight which can irradiate the inside of a lighting user's visual field by the general lighting instrument 49 and quantity of light change aiming at illuminating the whole inside of the vehicle to cut to homogeneity. For example, it applies to the lighting of an airplane inside the plane.
[0136] When it must illuminate with the minimum quantity of light with this operation gestalt in quantity of light change of outdoor daylight, and quantity of light change which gave correlation, or when the lighting user M does not need such quantity of light change, the inside of the target lighting user's M visual field is irradiated with the quantity of light of only the general lighting instrument 49 by turning OFF lighting switch SWa-- attached to local lighting instrument 50a--. And for needing the quantity of light higher than the quantity of light which it can irradiate with the general lighting instrument 49 when you need quantity of light change of outdoor daylight, and quantity of light change which gave correlation, the lighting user M is local lighting instrument 50a. -- Lighting switch SWa-- is turned ON. In this case, the control data for changing the quantity of light by quantity of light change of outdoor daylight and quantity of light change which gave the correlation based on the quantity of light change information which the control section 54 received from the quantity of light change information generating section 56 is outputted, and lighting-device 51a-- which received that control data carries out modulated light control of local lighting instrument 50a-- so that it may become the quantity of light according to control data. And while being able to illuminate the inside of the target lighting user's M visual field with the quantity of light to need by adding the lighting by this local lighting instrument 50a-- by which modulated light control was carried out, the brightness within the target lighting user's M visual field can be changed by quantity of light change of outdoor daylight, and the quantity of light change with correlation. It is local lighting instrument 50a here. -- The light source is covered by the opaque white panel of diffusibility etc., and even if it faces local lighting instrument 50a-- squarely, it is necessary to make it not sense an unpleasant glare.
[0137] In addition, the quantity of light change information outputted from the quantity of light change information generating section 56 consists of data which carry out modulated light control of local lighting instrument 50a-- like the above-mentioned operation gestalt 22. 52 in drawing is the lighting device of the general lighting instrument 49, and 55 is the power-source slack power feed zone of the whole system.
[0138]
[Effect of the Invention] While changing the illuminance of the lighting region illuminated by said lighting load so that invention of claim 1 may control lighting of the lighting load which illuminates indoor, and this lighting load and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon. Since the account illuminance of predetermined period Nakamae before and behind noon is made into an illuminance higher than the average illumination of the morning or an afternoon at least By being able to control a vigilance fall in the daytime, and being able to maintain vigilance, and controlling lighting indoor [whole] automatically, while being able to carry out biorhythm adjustment Time and effort, such as turning on and off of each lighting load, attachment and detachment, etc. become unnecessary, and it is effective in the ability to build a system

effective in the lighting of a hospital, a home for the aged, an underground center, office, etc.
[0139] Invention of claim 2 is set to invention of claim 1. A lighting control means In order to be characterized by controlling lighting of a lighting load based on the lighting control pattern which was made to correspond to transition of change of the quantity of light of the sunlight from known sunrise to sunset, and was set up beforehand, to receive sunlight and not to perform lighting control, A means to be able to set up beforehand the lighting control pattern of the form [pattern / lighting control] according to the optimal form and optimal operating condition for biorhythm, therefore to receive the quantity of light of outdoor daylight etc. is unnecessary, and the part system configuration also becomes easy.
[0140] The light sensing portion which outputs the signal which invention of claim 3 receives the lighting load which illuminates indoor, and sunlight, and has the quantity of light and correlation, The power control section which has the output signal of a light sensing portion, and correlation, and sets up the magnitude of the lighting power of a lighting load, Since it had the lighting control means which consists of a power feed zone which supplies lighting power to the lighting device which turns on a lighting load, and a lighting load through a lighting device with the lighting power set up by this power control section Biorhythm adjustment in the form where can obtain automatically an illuminance which has sunlight and correlation and a natural rhythm is regained become effective in carrying out in the form where vigilance is maintained, and also [or] Time and effort, such as turning on and off of each lighting load, attachment and detachment, etc. become unnecessary, and it is effective in the ability to build a system effective in the lighting of a hospital, a home for the aged, an underground center, office, etc.
[0141] Invention of claim 4 is equipped with the power level setting section which set up the lighting power level which serves as a minimum beforehand in invention of claim 3. Since a power control section controls the magnitude of the lighting power of a lighting load to measure the lighting power corresponding to the output signal of a light sensing portion, and the lighting power set up in the power level setting section, and to correspond to the lighting power of the larger one A necessary minimum illuminance can be secured and it is effective in the ability to give the practicality as indoor lighting.
[0142] Invention of claim 5 is equipped with the power level setting section which set up the power level which serves as beforehand an emergency power feed zone which supplies power regardless of control of a power control section with a minimum in invention of claim 3. Since a power control section is controlled to add the power of an emergency power feed zone to the supply voltage of a power feed zone, and to supply a lighting load when the supply voltage of a power feed zone is less from the lighting power of the level set up in the power level setting section By preparing independently the power source for securing the lighting power for obtaining the necessary minimum illuminance which is not related to outdoor daylight, it is effective in the ability to secure the lighting power for obtaining a necessary minimum illuminance, and give the practicality as indoor lighting.
[0143] The emergency power feed zone to which invention of claim 6 supplies power regardless of control of a power control section in invention of claim 3, Since the switch section which chooses whether the power of only a power feed zone is supplied to a lighting load or the power which added the power of an emergency power feed zone to the power of a power feed zone is supplied was added When there is little power of a power feed zone, can make lighting power of a lighting load into constant value, and can secure a necessary minimum illuminance, and when the power of a power feed zone is enough, an emergency power feed zone is separated. It is effective in lighting of a lighting load being controllable to become outdoor daylight and the illuminance which has correlation.
[0144] Since invention of claim 7 attaches the constant illuminance lighting load connected to the emergency power feed zone which supplies power regardless of control of a power control section, and an emergency power feed zone in invention of claim 3 and changes While being able to use alternatively in the part which needs the lighting which has outdoor daylight and correlation indoors, in other parts, it is effective in the ability to always secure fixed power and give the practicality as indoor lighting.
[0145] In invention of claims 4 and 5, since invention of claim 8 changes the power level value

set up in the power level setting section by time of day, at the time of an activity, there is effectiveness that making it bright etc. can set brightness required for indoor lighting as the level which changes with time of day during sleeping dark daytime at night. In invention of claim 3, invention of claim 9 considers as the constituting-from same solar battery-light sensing portion and power feed zone description, makes a facility small, can offer a rational system, and is effective in the ability to raise practicality further in the lighting system which has outdoor daylight and correlation.

[0146] In invention of claims 5-7, since invention of claim 10 constituted the light sensing portion and the power feed zone from same solar battery and constituted the emergency power feed zone from a source power supply and a rectifier, it is effective in the ability to cut down commercial power consumption using sunlight and make [make a facility small,] it an appropriate amount it not only to be able to to offer a rational system, but. Since invention of claim 11 supplies the power which added and graduated the low frequency passage filter to the output of a power feed zone or a solar battery in invention of claims 3, 7, and 8 as lighting power of a lighting load Can supply the graduated power to the lighting system which is a load, and indoor brightness ceases to change in a small time constant. The power which has outdoor daylight and correlation changes in response to fine fluctuation of outdoor daylight, like clouds cross the sun as it is, the brightness of indoor lighting changes frequently and a lot, and it is effective in that there is no fear, like trouble not only appears in the life in the interior of a room, but a bad influence arises to an eye.

[0147] Invention of claim 12 is the power level setting section in invention of claim 8. Since it considers as a value with small Nighttime and big day ranges and a morning stage transitorium and a stage transitorium in the evening are made to carry out time amount change of the power set point so that the sunrise and sunset at the time of fine weather may be simulated, respectively While attaching MERIHARI of brightness in day and night at night as dark, as day and night switch and illuminance change does not become rapid then, it is brightly [daytime] effective in the ability to raise a biorhythm adjustment function.

[0148] Invention of claim 13 is set to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. The day ranges characterized by installing so that a light-receiving side may turn to a sunrise direction are bright, and while attaching MERIHARI of brightness in day and night and making it illuminance change not become rapid at the end treatment rate of day and night as dark, Nighttime Especially a morning light can be attached to it importance and used in illuminance change which has outdoor daylight and correlation, and it is effective in the ability to raise a biorhythm adjustment function further.

[0149] In invention of claims 3, 9, and 10, as for invention of claim 14, at least light-receiving side moving part and the method of the sun add a judgment means to a light sensing portion or a solar battery. Since at least the method of the sun controls light-receiving side moving part based on the decision output of a judgment means so that a light sensing portion or the light-receiving side of a solar battery follows a solar direction a light-receiving side follows a solar direction -- as -- being controllable -- sunshine -- when aiming at the optical supplement to needy living conditions, it is effective in the ability to take in many light indoors as much as possible.

[0150] In invention of claims 3, 9, and 10, since invention of claim 15 is installed so that a light sensing portion or the light-receiving side of a solar battery may be suitable in the direction of a lantern light established in the building, it is effective in the ability to arrange the outdoor daylight which carries out incidence from an aperture, and the lighting which has correlation by the window, and raise the engine performance of illuminance amendment with lighting by the window. In claim 1 or invention of 2, since invention of claim 16 controls lighting of a lighting load so that the illuminance after the sunset of a lighting region turns into an illuminance suitable for an activity, it does not pose a real activity top problem, but is effective in a required illuminance being securable.

[0151] In claim 1 or invention of 2, since invention of claim 17 controls lighting of a lighting load to become the illuminance to which the illuminance near noon of a lighting region is suitable for rest at least, it can take rest once in the stage of a vigilance fall of an afternoon, and is effective

in the ability to raise subsequent working efficiency more. In claim 1 or invention of 2, since change of the illuminance of a lighting region is a continuous and gradual change, invention of claim 18 is effective in becoming easy to carry out bringing close to change of the natural light and regaining a natural rhythm, or maintaining.
[0152] In invention of claim 1, since invention of claim 19 set up the illuminance of the range of 1000-5000lx as a high illuminance, it is effective in the ability to aim at improvement in vigilance. In claim 16, since invention of claim 20 set up the illuminance of the range of 500-900lx as an illuminance suitable for an activity, it is effective in the ability to aim at improvement in working efficiency.
[0153] In invention of claim 17, since invention of claim 21 set up the illuminance of the range of 300-600lx as an illuminance suitable for rest, it is effective in becoming effective in rest. In claim 1 or invention of 2, since invention of claim 22 made average illumination of the morning of a lighting region size rather than the average illumination of the afternoon of a lighting region, it is effective in being easy to carry out recovery maintenance. Moreover, it is effective in the ability to adjust biorhythm.
[0154] In claims 1, 2, and 18, since invention of claim 23 made size the climbing speed of the illuminance of the lighting region of ante-meridian rather than the lowering speed of the illuminance of the lighting region of an afternoon, it is effective in being easy to carry out recovery maintenance. Moreover, it is effective in the ability to adjust biorhythm. Since invention of claim 24 gave fluctuation of illuminance change during the high illuminance period set up before or after noon, it is effective in being easier to carry out recovery maintenance.
[0155] In claim 21 or invention of 24, since the illuminance of a lighting region made smaller than the rate which rises from low level to high level the rate which descends to low level from high level, invention of claim 25 is effective in becoming effective in raising vigilance. In invention of claim 24, since invention of claim 26 gave fluctuation to the period of illuminance change of a lighting region, it is effective in becoming effective by maintaining vigilance.
[0156] Invention of claim 27 is set to claim 1 or invention of 2. A lighting load The task lighting load for changing the illuminance of a specific lighting region in the form superimposed on the basic lighting load and basic illuminance for obtaining a basic illuminance, Since it has a means to set up the important point of lighting control of a task lighting load, and needlessness and was made for change of the illuminance of a specific lighting region of the quantity of light of the sunlight from sunrise to sunset to change at least It is effective in the ability to perform lighting control which can adjust the biorhythm in individual level, holding down the power consumption by the whole lighting.
[0157] While invention of claim 28 forms the general lighting instrument which secures an illuminance [required for an activity and business] at its minimum in invention of claim 1 Since the local lighting instrument which bears the lighting of the location to need was formed as a lighting load controlled by the lighting control means Only a required place can be irradiated with a high illuminance with a local lighting instrument, therefore it is effective in the ability to perform lighting control which can adjust the biorhythm in a lighting user's individual level with little lighting energy.
[0158] In invention of claim 28, since invention of claim 29 controls only when a lighting user exists, since the illuminance within a lighting user's visual field will be changed with the lighting of a local lighting instrument if a detection means to detect a lighting user's existence or nonexistence is attached and existence of a lighting user is detected by this detection means, it is effective in futility being lost. Since invention of claim 30 used lighting fitting by which adjustable control is carried out according to a lighting user's location in the direction of radiation as a local lighting instrument in claim 28 or invention of 29 Since the need of installing lighting fitting in consideration of all the locations considered that an illuminance required in a lighting user's visual field can be given, and it must irradiate is lost even if it is not under a local lighting instrument, the number of a local lighting instrument ends few.
[0159] Since invention of claim 31 receives the direction-of-radiation information transmitted from the transmitting means with a receiving means in invention of claim 30 and changes the direction of radiation of a local lighting instrument in a lighting user's location direction based on

this direction-of-radiation information Since the direction of radiation of a local lighting instrument can be set up in the direction for which it asks by the lighting user's itself operating a transmitting means and making direction-of-radiation information transmit, The direction of radiation can be easily set up in the lighting user's existence location direction, and it is effective in becoming possible to give an illuminance required in a lighting user's visual field.
[0160] In invention of claim 1, since a lighting load is lighting fitting for residences, invention of claim 32 is effective in the lighting which can adjust a lighting user's biorhythm being obtained in a living environment. While changing the illuminance of the lighting region illuminated with said lighting fitting so that invention of claim 33 may control lighting of lighting fitting which performs lighting in a vehicle, and this lighting fitting and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset Since it had the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon, there are time difference and effectiveness that lighting control which can adjust a lighting user's biorhythm can be performed corresponding to the arrival time etc.

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* NOTICES *

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the lighting system which gives outdoor daylight and correlation and controls lighting the inside of a vehicle, and indoor.

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PRIOR ART

[Description of the Prior Art] There are the following four things in the field which needs the condition of lighting of having outdoor daylight and correlation. Adjustment of biorhythm (biological clock) is raised as the 1st field. There is a biological clock in the body and, as for the natural period of the biological clock, the ******** is known to 24 hours on the 1st for about 1 hour. For human being who set at the place which it follows, is under a dark room or always fixed lighting, and does not have the key of time of day, whenever it cannot perform adjustment of the time of day of a biological clock but actually follows a day as compared with the time of day of the clock of a life, the time of day of a biological clock is delay ******. In order to set a biological clock in 24 hours on the 1st, it must adjust in the direction which sets forward a clock for about 1 hour on the 1st. It is known that a stimulus of light (especially bright light) is effective in correction of such time of day of a biological clock. In the usual life according to natural environment, human being is adjusting time of day of a biological clock mainly by considering change of sunlight as a stimulus.
[0003] By the way, when adjustment of biorhythm (biological clock) does not work, causing various modulations to mind and body is known. As an intelligible example which many people experience, a jet lag symptom can be raised as abnormalities by difference of the time of day of a biological clock and the time of day of actually a life. Moreover, when a light required for adjustment of a biological clock runs short, abnormalities may be caused to biorhythm and the symptoms of season nature emotional disturbance (winter depression) may develop. Lack of light promotes biorhythm weakening by aging, and the opinion of leading to the day-and-night inversion anomalous behavior which are an old somnipathy and a part of dementia symptom, Nighttime wandering, etc. also has it. Report that abnormalities are looked at by biorhythm in many cases is among the children who cannot get up in the morning or cannot go to school.
[0004] It is known that the method of using light (high illuminance light) is effective in order to cancel or prevent such abnormalities in biorhythm (biological clock), lighting fitting is arranged the shape of equipment or a panel which equips the body and irradiates light at an eyeball, and the equipment which offers the high illuminance light source which illuminates the face is developed. As a location where it is a low illuminance and permanent conditions are assumed about an illuminance environment, a hospital, a home for the aged, an underground center, etc. are raised, and while a bright light for biorhythm (biological clock) adjustment is required, it is thought required for coincidence in these locations to modulate the light for many men. Furthermore, if modulated light which has correlation is outdoor daylight (sunlight) when modulating the light for the purpose of biorhythm adjustment in those locations, it will be thought that it is effective in maintaining or it regains a natural rhythm.
[0005] As 2nd field, the maintenance or improvement in vigilance by the bright light of day ranges is raised. Generally, it is known by receiving a luminous stimulus by the retina that secretion of hormone called Melatonin said to induce sleepiness is controlled. Moreover, the activity of the sympathetic nervous system rises by the luminous stimulus, and it is known that vigilance will improve as a result. The inclination which becomes large has the recovery maintenance effectiveness by such light as an illuminance becomes high. In addition, it is known that the recovery maintenance effectiveness will become [the direction which has fluctuation in

illuminance change] high rather than a fixed illuminance carries out long duration continuation also of the similarly bright luminous stimulus. It is more effective if the change rate at the time of an illuminance rise is especially enlarged for the change rate at the time of illuminance descent small.

[0006] Now, vigilance in the daytime changes with time amount also in daytime, although high level is usually maintained as compared with Nighttime, and it is known that some crests and troughs are shown. Among those, although a vigilance fall in the daytime is remarkable in the first half of an afternoon (equivalent to the time zone behind lunch), in spite of not taking lunch, it is known that change of vigilance will arise. Although there is individual difference in the degree of change of vigilance, when a vigilance fall in the daytime is large, the direction which takes rest once in the time zone of trough time amount is considered that subsequent working efficiency increases. Office, works, a school, an underground center, etc. are mentioned as a location where use of such a recovery maintenance operation by light is assumed.

[0007] sunshine is not taken in as 3rd field -- it is -- it is -- the equipment of a trailing type called **** "a sunflower" is known as what gives the same effectiveness as sunshine to needy living conditions. This equipment tends to introduce sunlight to living conditions with an optical fiber. As 4th field, use of the light about the lighting of places by the window, such as a store, and office, works, is known. In store lighting, generally, if outdoor daylight becomes strong, it is said that it is effective to make bright lighting of the place by the window in a store. It is for the bad influence that a store is sensed dark to arise, when the illuminance difference of the external world and a place by the window becomes large. In order to avoid this bad influence, when bright in outside, turning on many lighting by the window is performed. Moreover, when a side face is an aperture with many amounts of lighting in the interior of a room where people are usually in their room, such as office and works, daytime especially at the time of fine weather, the way large the brightness contrast of an indoor person, or a body and the window surface of a background and suitable of being visible cannot be maintained. In order to avoid such a bad influence, when bright in outside, it is said that it is effective to make head-lining lighting by the window brighter than the head-lining lighting of the center of the interior of a room.

[0008] In addition, although the illuminance of the face was an ideal, since exact measurement was difficult, the vertical illuminance in height a point of 1.2m (eyeball location when sitting on a chair) was usually used for the measuring point of an illuminance from the floor line as a substitution property. The illuminance which comes out to the following explanation is also depended on measurement in this location. In addition, the illuminance as criteria usually required for an activity etc. says the horizontal illuminance on the top face of a desk (as criteria required for an activity etc.). As for the relation of both the illuminances in the interior of a room, a horizontal illuminance will general usually be about 1.5 times the vertical illuminance.

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EFFECT OF THE INVENTION

[Effect of the Invention] While changing the illuminance of the lighting region illuminated by said lighting load so that invention of claim 1 may control lighting of the lighting load which illuminates indoor, and this lighting load and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon. Since the account illuminance of predetermined period Nakamae before and behind noon is made into an illuminance higher than the average illumination of the morning or an afternoon at least By being able to control a vigilance fall in the daytime, and being able to maintain vigilance, and controlling lighting indoor [whole] automatically, while being able to carry out biorhythm adjustment Time and effort, such as turning on and off of each lighting load, attachment and detachment, etc. become unnecessary, and it is effective in the ability to build a system effective in the lighting of a hospital, a home for the aged, an underground center, office, etc.
[0139] Invention of claim 2 is set to invention of claim 1. A lighting control means In order to be characterized by controlling lighting of a lighting load based on the lighting control pattern which was made to correspond to transition of change of the quantity of light of the sunlight from known sunrise to sunset, and was set up beforehand, to receive sunlight and not to perform lighting control, A means to be able to set up beforehand the lighting control pattern of the form [pattern / lighting control] according to the optimal form and optimal operating condition for biorhythm, therefore to receive the quantity of light of outdoor daylight etc. is unnecessary, and the part system configuration also becomes easy.
[0140] The light sensing portion which outputs the signal which invention of claim 3 receives the lighting load which illuminates indoor, and sunlight, and has the quantity of light and correlation, The power control section which has the output signal of a light sensing portion, and correlation, and sets up the magnitude of the lighting power of a lighting load, Since it had the lighting control means which consists of a power feed zone which supplies lighting power to the lighting device which turns on a lighting load, and a lighting load through a lighting device with the lighting power set up by this power control section Biorhythm adjustment in the form where can obtain automatically an illuminance which has sunlight and correlation and a natural rhythm is regained become effective in carrying out in the form where vigilance is maintained, and also [or] Time and effort, such as turning on and off of each lighting load, attachment and detachment, etc. become unnecessary, and it is effective in the ability to build a system effective in the lighting of a hospital, a home for the aged, an underground center, office, etc.
[0141] Invention of claim 4 is equipped with the power level setting section which set up the lighting power level which serves as a minimum beforehand in invention of claim 3. Since a power control section controls the magnitude of the lighting power of a lighting load to measure the lighting power corresponding to the output signal of a light sensing portion, and the lighting power set up in the power level setting section, and to correspond to the lighting power of the larger one A necessary minimum illuminance can be secured and it is effective in the ability to give the practicality as indoor lighting.
[0142] Invention of claim 5 is equipped with the power level setting section which set up the

power level which serves as beforehand an emergency power feed zone which supplies power regardless of control of a power control section with a minimum in invention of claim 3. Since a power control section is controlled to add the power of an emergency power feed zone to the supply voltage of a power feed zone, and to supply a lighting load when the supply voltage of a power feed zone is less from the lighting power of the level set up in the power level setting section By preparing independently the power source for securing the lighting power for obtaining the necessary minimum illuminance which is not related to outdoor daylight, it is effective in the ability to secure the lighting power for obtaining a necessary minimum illuminance, and give the practicality as indoor lighting.

[0143] The emergency power feed zone to which invention of claim 6 supplies power regardless of control of a power control section in invention of claim 3, Since the switch section which chooses whether the power of only a power feed zone is supplied to a lighting load or the power which added the power of an emergency power feed zone to the power of a power feed zone is supplied was added When there is little power of a power feed zone, can make lighting power of a lighting load into constant value, and can secure a necessary minimum illuminance, and when the power of a power feed zone is enough, an emergency power feed zone is separated. It is effective in lighting of a lighting load being controllable to become outdoor daylight and the illuminance which has correlation.

[0144] Since invention of claim 7 attaches the constant illuminance lighting load connected to the emergency power feed zone which supplies power regardless of control of a power control section, and an emergency power feed zone in invention of claim 3 and changes While being able to use alternatively in the part which needs the lighting which has outdoor daylight and correlation indoors, in other parts, it is effective in the ability to always secure fixed power and give the practicality as indoor lighting.

[0145] In invention of claims 4 and 5, since invention of claim 8 changes the power level value set up in the power level setting section by time of day, at the time of an activity, there is effectiveness that making it bright etc. can set brightness required for indoor lighting as the level which changes with time of day during sleeping dark daytime at night. In invention of claim 3, invention of claim 9 considers as the constituting-from same solar battery-light sensing portion and power feed zone description, makes a facility small, can offer a rational system, and is effective in the ability to raise practicality further in the lighting system which has outdoor daylight and correlation.

[0146] In invention of claims 5-7, since invention of claim 10 constituted the light sensing portion and the power feed zone from same solar battery and constituted the emergency power feed zone from a source power supply and a rectifier, it is effective in the ability to cut down commercial power consumption using sunlight and make [make a facility small,] it an appropriate amount it not only to be able to to offer a rational system, but. Since invention of claim 11 supplies the power which added and graduated the low frequency passage filter to the output of a power feed zone or a solar battery in invention of claims 3, 7, and 8 as lighting power of a lighting load Can supply the graduated power to the lighting system which is a load, and indoor brightness ceases to change in a small time constant. The power which has outdoor daylight and correlation changes in response to fine fluctuation of outdoor daylight, like clouds cross the sun as it is, the brightness of indoor lighting changes frequently and a lot, and it is effective in that there is no fear, like trouble not only appears in the life in the interior of a room, but a bad influence arises to an eye.

[0147] Invention of claim 12 is the power level setting section in invention of claim 8. Since it considers as a value with small Nighttime and big day ranges and a morning stage transitorium and a stage transitorium in the evening are made to carry out time amount change of the power set point so that the sunrise and sunset at the time of fine weather may be simulated, respectively While attaching MERIHARI of brightness in day and night at night as dark, as day and night switch and illuminance change does not become rapid then, it is brightly [daytime] effective in the ability to raise a biorhythm adjustment function.

[0148] Invention of claim 13 is set to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. The day ranges characterized by installing so that a light-receiving side may

turn to a sunrise direction are bright, and while attaching MERIHARI of brightness in day and night and making it illuminance change not become rapid at the end treatment rate of day and night as dark, Nighttime Especially a morning light can be attached to it importance and used in illuminance change which has outdoor daylight and correlation, and it is effective in the ability to raise a biorhythm adjustment function further.

[0149] In invention of claims 3, 9, and 10, as for invention of claim 14, at least light-receiving side moving part and the method of the sun add a judgment means to a light sensing portion or a solar battery. Since at least the method of the sun controls light-receiving side moving part based on the decision output of a judgment means so that a light sensing portion or the light-receiving side of a solar battery follows a solar direction a light-receiving side follows a solar direction -- as -- being controllable -- sunshine -- when aiming at the optical supplement to needy living conditions, it is effective in the ability to take in many light indoors as much as possible.

[0150] In invention of claims 3, 9, and 10, since invention of claim 15 is installed so that a light sensing portion or the light-receiving side of a solar battery may be suitable in the direction of a lantern light established in the building, it is effective in the ability to arrange the outdoor daylight which carries out incidence from an aperture, and the lighting which has correlation by the window, and raise the engine performance of illuminance amendment with lighting by the window. In claim 1 or invention of 2, since invention of claim 16 controls lighting of a lighting load so that the illuminance after the sunset of a lighting region turns into an illuminance suitable for an activity, it does not pose a real activity top problem, but is effective in a required illuminance being securable.

[0151] In claim 1 or invention of 2, since invention of claim 17 controls lighting of a lighting load to become the illuminance to which the illuminance near noon of a lighting region is suitable for rest at least, it can take rest once in the stage of a vigilance fall of an afternoon, and is effective in the ability to raise subsequent working efficiency more. In claim 1 or invention of 2, since change of the illuminance of a lighting region is a continuous and gradual change, invention of claim 18 is effective in becoming easy to carry out bringing close to change of the natural light and regaining a natural rhythm, or maintaining.

[0152] In invention of claim 1, since invention of claim 19 set up the illuminance of the range of 1000-5000lx as a high illuminance, it is effective in the ability to aim at improvement in vigilance. In claim 16, since invention of claim 20 set up the illuminance of the range of 500-900lx as an illuminance suitable for an activity, it is effective in the ability to aim at improvement in working efficiency.

[0153] In invention of claim 17, since invention of claim 21 set up the illuminance of the range of 300-600lx as an illuminance suitable for rest, it is effective in becoming effective in rest. In claim 1 or invention of 2, since invention of claim 22 made average illumination of the morning of a lighting region size rather than the average illumination of the afternoon of a lighting region, it is effective in being easy to carry out recovery maintenance. Moreover, it is effective in the ability to adjust biorhythm.

[0154] In claims 1, 2, and 18, since invention of claim 23 made size the climbing speed of the illuminance of the lighting region of ante-meridian rather than the lowering speed of the illuminance of the lighting region of an afternoon, it is effective in being easy to carry out recovery maintenance. Moreover, it is effective in the ability to adjust biorhythm. Since invention of claim 24 gave fluctuation of illuminance change during the high illuminance period set up before or after noon, it is effective in being easier to carry out recovery maintenance.

[0155] In claim 21 or invention of 24, since the illuminance of a lighting region made smaller than the rate which rises from low level to high level the rate which descends to low level from high level, invention of claim 25 is effective in becoming effective in raising vigilance. In invention of claim 24, since invention of claim 26 gave fluctuation to the period of illuminance change of a lighting region, it is effective in becoming effective by maintaining vigilance.

[0156] Invention of claim 27 is set to claim 1 or invention of 2. A lighting load The task lighting load for changing the illuminance of a specific lighting region in the form superimposed on the basic lighting load and basic illuminance for obtaining a basic illuminance, Since it has a means to

set up the important point of lighting control of a task lighting load, and needlessness and was made for change of the illuminance of a specific lighting region of the quantity of light of the sunlight from sunrise to sunset to change at least It is effective in the ability to perform lighting control which can adjust the biorhythm in individual level, holding down the power consumption by the whole lighting.

[0157] While invention of claim 28 forms the general lighting instrument which secures an illuminance [required for an activity and business] at its minimum in invention of claim 1 Since the local lighting instrument which bears the lighting of the location to need was formed as a lighting load controlled by the lighting control means Only a required place can be irradiated with a high illuminance with a local lighting instrument, therefore it is effective in the ability to perform lighting control which can adjust the biorhythm in a lighting user's individual level with little lighting energy.

[0158] In invention of claim 28, since invention of claim 29 controls only when a lighting user exists, since the illuminance within a lighting user's visual field will be changed with the lighting of a local lighting instrument if a detection means to detect a lighting user's existence or nonexistence is attached and existence of a lighting user is detected by this detection means, it is effective in futility being lost. Since invention of claim 30 used lighting fitting by which adjustable control is carried out according to a lighting user's location in the direction of radiation as a local lighting instrument in claim 28 or invention of 29 Since the need of installing lighting fitting in consideration of all the locations considered that an illuminance required in a lighting user's visual field can be given, and it must irradiate is lost even if it is not under a local lighting instrument, the number of a local lighting instrument ends few.

[0159] Since invention of claim 31 receives the direction-of-radiation information transmitted from the transmitting means with a receiving means in invention of claim 30 and changes the direction of radiation of a local lighting instrument in a lighting user's location direction based on this direction-of-radiation information Since the direction of radiation of a local lighting instrument can be set up in the direction for which it asks by the lighting user's itself operating a transmitting means and making direction-of-radiation information transmit, The direction of radiation can be easily set up in the lighting user's existence location direction, and it is effective in becoming possible to give an illuminance required in a lighting user's visual field.

[0160] In invention of claim 1, since a lighting load is lighting fitting for residences, invention of claim 32 is effective in the lighting which can adjust a lighting user's biorhythm being obtained in a living environment. While changing the illuminance of the lighting region illuminated with said lighting fitting so that invention of claim 33 may control lighting of lighting fitting which performs lighting in a vehicle, and this lighting fitting and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset Since it had the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon, there are time difference and effectiveness that lighting control which can adjust a lighting user's biorhythm can be performed corresponding to the arrival time etc.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, when talking generally about four fields mentioned above, there is a trouble that there is no lighting system by which modulated light control is automatically carried out so that it may have outdoor daylight and correlation. That is, in the 1st field, the available existing lighting system is a small thing aiming at the object for individual treatment, and has the trouble that attachment and detachment, ON / off control, etc. is troublesome. Furthermore, when it was said that biorhythm adjustment will be carried out in locations, such as a hospital, a home for the aged, an underground center, etc. where it is a low illuminance and permanent conditions are assumed about an illuminance environment, with existing small equipment, many number was required, and attachment and detachment, control of ON/OFF, etc. took many helps to it, and there was a trouble of not being practical.
[0010] Moreover, in the 2nd field, the available existing lighting system was not yet realized. Moreover, although the equipment the "sunflower" which is the conventional technique in the 3rd field had the very large facility and cost also became large as a result, the quantity of light obtained with an optical fiber had the trouble that it was few compared with general indoor lighting.
[0011] In the 4th field, the light of the number of lightings and class of lighting by the window was changed and modulated with hand control, and there was a trouble that it was automatic and modulated light which attains to a multistage story could not be performed. Furthermore, the technical problem that the power of the need minimal dose is secured in order to give the practicality as indoor lighting, Since the power which has outdoor daylight and correlation, always controlling the technical problem that the power source for securing the power of the need minimal dose regardless of outdoor daylight is prepared independently, and power, on setting level cannot be obtained The technical problem that power enables it to switch selection in the condition of having been controlled by setting level, or the condition of having outdoor daylight and correlation, if needed, The lighting system which receives supply of the power which is not related to outdoor daylight, the lighting system which receives supply of the power which has correlation, and outdoor daylight is divided. At the time of an activity, there are **, such as a technical problem that making it bright etc. enables it to set brightness required for indoor lighting as the level which changes with time of day, during sleeping the technical problem which enables it to use the lighting which has outdoor daylight and correlation in an indoor need part, for example, night, dark daytime.
[0012] Even if it makes a facility small, it offers a rational system and it does not depend on commercial power using sunlight, it is made to end, if practicality is further searched for in such a lighting system. Or if clouds change in response to fine fluctuation of outdoor daylight, such as crossing the sun, as it is, the technical problem referred to as cutting down commercial power consumption and making it an appropriate amount using sunlight and the power which has outdoor daylight and correlation Since there is a possibility trouble not only appears in the life in the interior of a room, but that the brightness of indoor lighting may change frequently and a lot, and a bad influence may arise to an eye, with a time constant with indoor small brightness, the technical problem it is made not to change occurs so that there may be such no trouble.
[0013] Next, there is the following as a technical problem peculiar to each field of the invention.

While attaching MERIHARI of brightness in day and night at the field of the invention aiming at the 1st biorhythm adjustment as day ranges are bright and Nighttime is dark, day and night switch, the technical problem referred to as making it illuminance change not become rapid then occurs, and the technical problem that especially a morning light is attached to it importance and used in illuminance change which has outdoor daylight and correlation occurs.

[0014] Fluctuation is given to an illuminance in the field of the invention aiming at the recovery maintenance by the 2nd bright light. The technical problem that the recovery maintenance effectiveness is further heightened rather than an only bright light, the technical problem that ** -> dark is made into a rate smaller than dark -> ** about an illuminance change rate, The technical problem that illuminance change is regular and it is made not to become monotonous, and illumination control are divided into basic lighting and task lighting, and the technical problem that suitable control is carried out according to an individual condition with task lighting occurs.

[0015] the 3rd sunshine -- in the field of the invention aiming at the optical supplement to needy living conditions, the technical problem that many light is taken in as much as possible indoors occurs in the lighting which has outdoor daylight and correlation. Although the lighting which has outdoor daylight and correlation is arranged by the window and indoor illuminance amendment is performed in the field of the invention aiming at illuminance amendment with the 4th lighting by the window, the technical problem that the outdoor daylight and correlation which carry out incidence from an aperture are given occurs.

[0016] It is in offering the lighting system which this invention is made for the purpose of solving an above-mentioned technical problem, and has transition and correlation of the quantity of light of sunlight, and biorhythm adjustment can be performed, and maintenance of vigilance tends to carry out. In addition, the practicality as indoor lighting is given, and further, while using a facility as a rational system small, it aims at offering a lighting system which cuts down commercial power consumption.

[0017] Furthermore, the lighting system which can adjust biorhythm better with the lighting which has outdoor daylight and correlation Moreover, the lighting system which can control light which the vigilance of day ranges is raised in office etc. and working efficiency goes up moreover, sunshine -- it aims at offering the lighting system which enlarges the illuminance of lighting by the window for the lighting system which can be illuminated with light like a nature also to needy living conditions when bright further again in the outside of an aperture, and does not produce trouble in how in the interior of a room to be visible.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose in invention of claim 1 While changing the illuminance of the lighting region illuminated by said lighting load so that lighting of the lighting load which illuminates indoor, and this lighting load may be controlled and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon. Since the account illuminance of predetermined period Nakamae before and behind noon is made into an illuminance higher than the average illumination of the morning or an afternoon at least, while being able to carry out biorhythm adjustment, a vigilance fall in the daytime can be controlled and vigilance can be maintained.
[0019] It is characterized by for a lighting control means to control lighting of a lighting load by invention of claim 2 in invention of claim 1 based on the lighting control pattern which was made to correspond to transition of change of the quantity of light of the sunlight from known sunrise to sunset, and was set up beforehand, and since sunlight receives and lighting control does not perform, the lighting control pattern of the form [pattern / lighting control] according to the optimal form and the optimal operating condition for biorhythm can set up beforehand.
[0020] The lighting load which illuminates indoor in invention of claim 3, and the light sensing portion which outputs the signal which receives sunlight and has the quantity of light and correlation, The power control section which has the output signal of a light sensing portion, and correlation, and sets up the magnitude of the lighting power of a lighting load, It is what was characterized by having the lighting control means which consists of a power feed zone which supplies lighting power to the lighting device which turns on a lighting load, and a lighting load through a lighting device with the lighting power set up by this power control section. An illuminance which has sunlight and correlation can be obtained and it becomes effective in carrying out in the form where are the form where a natural rhythm is regained for biorhythm adjustment, or a rhythm and the vigilance of daytime are maintained.
[0021] It has the power level setting section which set up the lighting power level which serves as a minimum beforehand in invention of claim 3 in invention of claim 4. It is characterized by a power control section controlling the magnitude of the lighting power of a lighting load to measure the lighting power corresponding to the output signal of a light sensing portion, and the lighting power set up in the power level setting section, and to correspond to the lighting power of the larger one. A necessary minimum illuminance can be secured and the practicality as indoor lighting can be given.
[0022] It has the power level setting section which set up the power level which serves as beforehand an emergency power feed zone which supplies power regardless of control of a power control section with a minimum in invention of claim 3 in invention of claim 5. It is characterized by controlling a power control section to add the power of an emergency power feed zone to the supply voltage of a power feed zone, and to supply a lighting load, when the supply voltage of a power feed zone is less from the lighting power of the level set up in the power level setting section. By preparing independently the power source for securing the

lighting power for obtaining the necessary minimum illuminance which is not related to outdoor daylight, the lighting power for obtaining a necessary minimum illuminance can be secured, and the practicality as indoor lighting can be given.
[0023] The emergency power feed zone which supplies power regardless of control of a power control section in invention of claim 3 in invention of claim 6, It is characterized by adding the switch section which chooses whether the power of only a power feed zone is supplied to a lighting load, or the power which added the power of an emergency power feed zone to the power of a power feed zone is supplied. When there is little power of a power feed zone, lighting power of a lighting load can be made into constant value, a necessary minimum illuminance can be secured, and when the power of a power feed zone is enough, an emergency power feed zone can be separated, and lighting of a lighting load can be controlled to become outdoor daylight and the illuminance which has correlation.
[0024] It is characterized by attaching the constant illuminance lighting load connected to the emergency power feed zone which supplies power regardless of control of a power control section, and an emergency power feed zone in invention of claim 3 in invention of claim 7, and changing. While being able to use alternatively in the part which needs the lighting which has outdoor daylight and correlation indoors, in other parts, fixed power can always be secured and the practicality as indoor lighting can be given.
[0025] In invention of claim 8, since the power level value set as claims 4 and 5 in the power level setting section in invention is changed by time of day, at the time of an activity, making it bright etc. can set brightness required for indoor lighting as the level which changes with time of day during sleeping dark daytime at night. In invention of claim 9, in invention of claim 3, it can consider as the constituting-from same solar battery-light sensing portion and power feed zone description, a facility can be made small, a rational system can be offered, and practicality can be further raised in the lighting system which has outdoor daylight and correlation.
[0026] It is characterized by having constituted the light sensing portion and the power feed zone from same solar battery, and constituting an emergency power feed zone from invention of claim 10 with a source power supply and a rectifier in invention of claims 5-7, in invention according to claim 5 to 7, and makes a facility small, and it can cut down commercial power consumption using sunlight, and it not only can offer a rational system, but can make it an appropriate amount.
[0027] It is characterized by supplying the power which added and graduated the low frequency passage filter to the output of a power feed zone or a solar battery in invention of claims 3, 7, and 8 in invention of claim 11 as lighting power of a lighting load. Can supply the graduated power to the lighting system which is a load, and indoor brightness ceases to change in a small time constant. The power which has outdoor daylight and correlation changes in response to fine fluctuation of outdoor daylight, like clouds cross the sun as it is, the brightness of indoor lighting changes frequently and a lot, and there is no fear, like trouble not only appears in the life in the interior of a room, but a bad influence arises to an eye.
[0028] In invention of claim 12, it sets to invention of claim 8. In the power level setting section It is characterized by considering as a value with small Nighttime and big day ranges, and making a morning stage transitorium and a stage transitorium in the evening carry out time amount change of the power set point so that the sunrise and sunset at the time of fine weather may be simulated, respectively. Brightly [daytime], while attaching MERIHARI of brightness in day and night as dark, as day and night switch and illuminance change does not become rapid then, a biorhythm adjustment function can be raised at night.
[0029] In invention of claim 13, it sets to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. The day ranges characterized by installing so that a light-receiving side may turn to a sunrise direction are bright, and while attaching MERIHARI of brightness in day and night and making it illuminance change not become rapid at the end treatment rate of day and night as dark, Nighttime Especially a morning light can be attached to it importance and used in illuminance change which has outdoor daylight and correlation, and a biorhythm adjustment function can be raised further.
[0030] In invention of claim 14, at least light-receiving side moving part and the method of the

sun add a judgment means to a light sensing portion or a solar battery in invention of claims 3, 9, and 10. It is characterized by at least the method of the sun controlling light-receiving side moving part based on the decision output of a judgment means so that a light sensing portion or the light-receiving side of a solar battery follows a solar direction. a light-receiving side follows a solar direction -- as -- being controllable -- sunshine -- when aiming at the optical supplement to needy living conditions, many light can be taken in as much as possible indoors.
[0031] In invention of claim 15, in invention of claims 3, 9, and 10, the outdoor daylight which is characterized by installing so that a light sensing portion or the light-receiving side of a solar battery may be suitable in the direction of a lantern light established in the building, and carries out incidence from an aperture, and the lighting which has correlation can be arranged by the window, and the engine performance of illuminance amendment with lighting by the window can be raised. Since lighting of a lighting load is controlled by invention of claim 16 so that the illuminance after the sunset of a lighting region turns into an illuminance suitable for an activity in claim 1 or invention of 2, it does not become a real activity top problem, but a required illuminance can be secured.
[0032] Since lighting of a lighting load is controlled by invention of claim 17 to become the illuminance to which the illuminance near noon of a lighting region is suitable for rest at least in claim 1 or invention of 2, in the stage of a vigilance fall of an afternoon, rest can be taken once, and subsequent working efficiency can be raised more. In invention of claim 18, in claim 1 or invention of 2, since change of the illuminance of a lighting region is a continuous and gradual change, it becomes easy to carry out maintaining the vigilance of bringing close to change of the natural light and regaining a natural rhythm, a rhythm, or day ranges.
[0033] In invention of claim 19, in invention of claim 1, it is characterized by setting up the illuminance of the range of 1000-5000lx as a high illuminance, biorhythm adjustment becomes more effective, and improvement in maintenance of vigilance can also be aimed at. In invention of claim 20, in claim 16, since the illuminance of the range of 500-900lx was set up as an illuminance suitable for an activity, improvement in working efficiency can be aimed at.
[0034] In invention of claim 21, in invention of claim 17, since the illuminance of the range of 300-600lx was set up as an illuminance suitable for rest, it becomes effective in rest. In invention of claim 22, in claim 1 or invention of 2, it is characterized by making average illumination of the morning of a lighting region into size rather than the average illumination of the afternoon of a lighting region, and is easy to carry out recovery maintenance. Moreover, it is more effective also for biorhythm adjustment.
[0035] In invention of claim 23, in claims 1, 2, and 18, it is characterized by making the climbing speed of the illuminance of the lighting region of ante-meridian into size rather than the lowering speed of the illuminance of the lighting region of an afternoon, and is easy to carry out recovery maintenance. Moreover, it is more effective also for biorhythm adjustment. In invention of claim 24, it is characterized by giving fluctuation of illuminance change, and is easier to carry out recovery maintenance during the high illuminance period set up before or after noon.
[0036] In invention of claim 25, in claim 21 or invention of 24, the illuminance of a lighting region is characterized by making smaller than the rate which rises from low level to high level the rate which descends to low level from high level, and becomes effective in raising vigilance. In invention of claim 26, in invention of claim 24, it is characterized by giving fluctuation to the period of illuminance change of a lighting region, and becomes effective by maintaining vigilance.
[0037] In invention of claim 27, it sets to claim 1 or invention of 2. A lighting load The task lighting load for changing the illuminance of a specific lighting region in the form superimposed on the basic lighting load and basic illuminance for obtaining a basic illuminance, Having a means to set up the important point of lighting control of a task lighting load, and needlessness, and the illuminance of a specific lighting region being characterized by making it change like quantity of light change of the sunlight from sunrise to sunset at least, and holding down the power consumption by the whole lighting Lighting control which can adjust the biorhythm in individual level can be performed.
[0038] While forming the general lighting instrument which secures an illuminance [required for an activity and business] at its minimum in invention of claim 1 in invention of claim 28 It is

characterized by forming the local lighting instrument which bears the lighting of the location to need as a lighting load controlled by the lighting control means. Only a required place can be irradiated with a high illuminance with a local lighting instrument, therefore lighting control which can adjust the biorhythm in a lighting user's individual level can be performed with little lighting energy.

[0039] Since it will control by invention of claim 29 only when it is characterized by changing the illuminance within a lighting user's visual field with the lighting of a local lighting instrument and a lighting user exists if a detection means to detect a lighting user's existence or nonexistence is attached in invention of claim 28 and existence of a lighting user is detected by this detection means, futility is lost. It is characterized by using lighting fitting by which adjustable control is carried out according to a lighting user's location in the direction of radiation as a local lighting instrument in claim 28 or invention of 29 in invention of claim 30. Since the need of installing lighting fitting in consideration of all the locations considered that an illuminance required in a lighting user's visual field can be given, and it must irradiate is lost even if it is not under a local lighting instrument, the number of a local lighting instrument ends few.

[0040] It is characterized by for a receiving means receiving the direction-of-radiation information transmitted from the transmitting means in invention of claim 30 in invention of claim 31, and changing the direction of radiation of a local lighting instrument in a lighting user's location direction based on this direction-of-radiation information. Since the direction of radiation of a local lighting instrument can be set up in the direction for which it asks by the lighting user's itself operating a transmitting means and making direction-of-radiation information transmit, the direction of radiation can be easily set up in the lighting user's existence location direction, and it becomes possible to give an illuminance required in a lighting user's visual field.

[0041] In invention of claim 32, in invention of claim 1, it is characterized by a lighting load being lighting fitting for residences, and the lighting which can adjust a lighting user's biorhythm is obtained in a living environment. While changing the illuminance of the lighting region illuminated with said lighting fitting so that lighting of lighting fitting which performs lighting in a vehicle, and this lighting fitting may be controlled by invention of claim 33 and it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset It is characterized by having the lighting control means which makes the account illuminance of predetermined period Nakamae before and behind noon at least an illuminance higher than the average illumination of the morning or an afternoon, and lighting control which can adjust a lighting user's biorhythm can be performed corresponding to time difference, the arrival time, etc.

[0042]

[Embodiment of the Invention]

Drawing 1 shows this operation gestalt and this operation gestalt receives sunlight. (Operation gestalt 1) The light sensing portion 1 which outputs the signal which has the quantity of light and correlation and which consists of photo detectors, such as a solar battery or CdS, for example, The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to a light sensing portion 1 and has the output signal of a light sensing portion 1, and correlation, It consists of power feed zones 3 which supply power to the lighting load 5 through the lighting device 6 which carries out continuation modulated light lighting of the lighting load 5, and this lighting device 4 with the lighting power according to the control signal of the power control section 2.

[0043] With this operation gestalt (even other operation gestalten described below are the same), using a electric-discharge lamp load like a fluorescent lamp, the lighting load 5 carries out adjustable [of the oscillation frequency] to a lighting device 4 according to the width of face of the control signal from the outside corresponding to this, changes the impedance for stabilizers, and uses inverter equipment with the continuation modulated light function which controls lighting power (lamp current). In addition, when an incandescent lamp and a halogen lamp are lighting loads, a dimmer which controls lighting power by phase control etc. according to the width of face of the control signal from the outside is used. You may be lighting devices other than such [, of course] a method. Moreover, the power feed zone 3 uses what supplies direct

current power to the lighting device 4 which is inverter equipment.
[0044] Next, actuation of this operation gestalt is explained in full detail. A light sensing portion 1 outputs the voltage signal which has the quantity of light of sunlight, and correlation (proportionality) to the power control section 2. The power control section 2 is the reference voltage signal V0 of the reference-waveform generating section 6 which consists of a comparator 7 which compares the reference voltage signal of the triangular waveform of predetermined frequency and the voltage signal from a light sensing portion 1 which are generated in the reference-waveform generating section 6, and shows a comparator 7 to drawing 2 (a). Voltage signal V1 from a light sensing portion 1 When high, "H" output is taken out as shown in drawing 2 (b), and the "L" output is taken out when [that] opposite. That is, if the light-receiving quantity of light of sunlight increases and the light-receiving quantity of light will decrease conversely a control signal with small signal width of face again, signal width of face will generate the large control signal of "H", and will output to a lighting device 4.
[0045] A lighting device 4 sets up the lighting power supplied to the lighting load 5 so that it may change, as the indoor illuminance (for example, illuminance on the top face of a desk) which is a candidate for lighting shows drawing 3 (b) in proportion to change of the light-receiving quantity of light (outdoor daylight) from the sun shown in drawing 3 (a) according to the width of face of the control signal to input. That is, if the light-receiving quantity of light decreases and the width of face of a control signal becomes large, a lighting device 4 will make lighting power small according to it, will make the optical output of the lighting load 5 small, and will reduce the illuminance of a lighting region. Conversely, if the light-receiving quantity of light increases and the width of face of a control signal becomes small, lighting power is enlarged, the optical output of the lighting load 5 will be made to increase, and the illuminance of a lighting region will be made high.
[0046] Drawing 4 shows this operation gestalt, and this operation gestalt receives sunlight so that it may illustrate. (Operation gestalt 2) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, While having the power feed zone 3 which supplies power to the lighting load 5 through the lighting device 4 which carries out continuation modulated light lighting of the lighting load 5, and this lighting device 4 with the lighting power according to the control signal of the power control section 2 It consists of the power level setting sections 8 for setting up beforehand the minimum level of the lighting power of the lighting load 5. With a **** operation gestalt, the thing of the configuration as the operation gestalt 1 with same light sensing portion 1, lighting device 4, lighting load 5, and power feed zone 3 is used.
[0047] Next, actuation of this operation gestalt is explained in full detail. A light sensing portion 1 generates the voltage signal which has the quantity of light of sunlight, and correlation (proportionality) like the operation gestalt 1. The power control section 2 consists of a comparator 7 which compares the reference voltage signal of the triangular waveform of predetermined frequency and the voltage signal from a light sensing portion 1 which are generated in the reference-waveform generating section 6, and a comparator 7 is the reference voltage V0 of the reference-waveform generating section 6. Voltage signal V1 from a light sensing portion 1 When high, a comparator 7 takes out "H" output, and when [that] opposite, it takes out the "L" output (refer to drawing 2 (a) and (b)). The control signal constituted by "H" output is inputted into AND circuit 9 with the setting signal outputted from the power level setting section 8, and an AND is taken.
[0048] The setting section 11 which sets up the power level from which the power level setting section 8 serves as the reference-waveform generating section 10 and a minimum and which consists of volume 12 and a source 13 of reference voltage, for example, Consist of a comparator 14 and the reference-waveform generating section 10 outputs the reference voltage signal of a triangular waveform like the reference-waveform generating section 6 of the power control section 2. A comparator 14 outputs the signal of "H", when a reference voltage signal is compared with the output voltage of the setting section 11 and the reference-waveform

generating section 10 reference-voltage signal is over the output voltage of the setting section 11. In addition, the reference-waveform generating sections 6 and 10 shall synchronize, and shall output the same wave-like reference voltage signal.
[0049] Therefore, if the output signal of a comparator 7 is outputted to a lighting device 4 as a control signal and the width of face of the output signal of a comparator 7 becomes larger than the width of face of the output signal of a comparator 14 when the width of face of the output signal of a comparator 7 is smaller than the width of face of the output signal of a comparator 14, the output signal of a comparator 14 will be outputted to a lighting device 4 as a control signal. That is, when the light-receiving quantity of light of a light sensing portion 1 decreases and the width of face of the output signal of a comparator 7 becomes larger than the width of face of the output signal of a comparator 14, the width of face of a control signal is fixed to the width of face of the output signal of a comparator 14. Therefore, the minimum level of lighting power will be set up with the width of face of the output signal of a comparator 14.
[0050] The lighting power supplied to the lighting load 5 so that it may change, as the indoor illuminance (for example, illuminance on the top face of a desk) which is a candidate for lighting shows drawing 5 (b) in proportion to change of the light-receiving quantity of light (outdoor daylight) from the sun shown in drawing 5 (a) according to the width of face of the control signal which it ** and is inputted in the lighting device 4 of this operation gestalt is set up. That is, if lighting power is made small, an illuminance is reduced and the light-receiving quantity of light increases conversely when there is little light-receiving quantity of light, lighting power will be enlarged and an illuminance will be made high. Moreover, if the light-receiving quantity of light of a light sensing portion 1 becomes below fixed, it will fix to the illuminance of the minimum level set up beforehand, and a necessary minimum illuminance will be secured.
[0051] Drawing 6 so that this operation gestalt may be shown and it may illustrate (Operation gestalt 3) With this operation gestalt As a power source of supply which supplies lighting power to the lighting load 5 through a lighting device 4 Diode D2 for antisuckbacks The power feed zone 3 which consists of a solar battery which minded and connected the outgoing end to the power-source input edge of a lighting device 4, The current-limiting circuit 16 and diode D1 for antisuckbacks The emergency power feed zone 15 which consists of a source power supply which minded and connected the outgoing end to the power-source input edge of a lighting device 4, and a rectifier is used.
[0052] Moreover, the power level setting section 20 which consists of the variable attenuator 17 and the reference-waveform generating section 18 which input **** of the power-source input edge of a lighting device 4, and a comparator 19 is attached. A lighting device 4 controls the lighting power of the lighting load 5 in response to the control signal from the power level setting section 20 and the power control section 2, and carries out modulated light lighting of the lighting load 5. The power control section 2 outputs a control signal with the width of face correlated with the quantity of light of sunlight in response to the output of a light sensing portion 1 like the thing of the operation gestalten 1 and 2, and is omitting by drawing 6 about the internal configuration.
[0053] The reference-waveform generating section 18 of the power level setting section 20 outputs the reference voltage of the same triangular waveform as the reference-waveform generating section 6 of the power control section 2. Next, actuation of this operation gestalt is explained in full detail. If it ** and is working [a system], an electric power supply is performed from the power feed zone 3 and the emergency power feed zone 15 to a lighting device 4, but when lighting power increases, the burden of the emergency power feed zone 15 also becomes large.
[0054] Although the power supply of the emergency power feed zone 15 is small because of the auxiliary role of the power control section 2, and the output current increases when the lighting power of a lighting device 4 increases and a burden becomes large, the current-limiting circuit 16 will receive the current limiting. although the burden by the side of the power feed zone 3 will increase, since [therefore,] there is a limitation also in the power which can supply the power feed zone 3 -- the power which can supply the power feed zone 3 -- ** -- when lighting power is larger than the power which combined the power which can supply the emergency power feed

zone 15, it will be in an overload condition and the input voltage of the lighting device 4 which is a load will decline.
[0055] On the other hand, the power level setting section 20 generates the electrical potential difference which inputs the input voltage of a lighting device 4 into variable attenuator 17, and ****s in the voltage level corresponding to that electrical potential difference, a comparator 19 compares this electrical potential difference and the reference voltage which the reference-waveform generating section 18 outputs, and if the same control signal as the power control section 2 is outputted from a comparator 19 and the input voltage of a lighting device 4 declines as mentioned above, in connection with it, the width of face of a control signal will become large. As for the control signal of this power level setting section 20, an OR is taken by the control signal and OR circuit 48 from the power control section 2. Even if the width of face of the control signal which it inputs into a lighting device 4, for example, the light income of a light sensing portion 1 increases, and is outputted from the power control section 2 becomes small When the input voltage of a lighting device 4 declines according to an overload condition as mentioned above, the width of face of the control signal of the power level setting section 20 becomes larger than the width of face of the control signal outputted from the power control section 2, and a lighting device 4 operates in the direction which makes lighting power small in response to this control signal. That is, lighting power will be controlled to make the lighting load 5 turn on with the lighting power according to the maximum power which can carry out current supply of the power feed zone 3 and the emergency power feed zone 15.
[0056] Drawing 7 shows this operation gestalt, and this operation gestalt receives sunlight so that it may illustrate. (Operation gestalt 4) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, A lighting device 4 like the modulated light lighting device which makes the lighting load 5 turn on with the lighting power according to the control signal of the power control section 2, While having the power feed zone 3 which supplies power to the lighting load 5 through this lighting device 4, it has the emergency power feed zone 15. the output of this emergency power feed zone 15 -- diode D1 for back flow inhibition Switch SW1 minding -- the power-source input edge of a lighting device 4 -- moreover, the output of the power feed zone 3 -- diode D2 for back flow inhibition It minds and has connected with the power-source input edge of a lighting device 4.
[0057] In the configuration of a light sensing portion 1, and the lighting device 4, the lighting load 5 and the power feed zone 3, according to the operation gestalt 1, the configuration of the emergency power feed zone 15 shall have applied to the operation gestalt 3 here. Moreover, the power control section 2 is 2 contact change-over switch SW2 about the outgoing end of a comparator 7. It has connected with one stationary contact a, and is a change-over switch SW2. If a traveling contact is connected to a stationary contact a The control signal which a comparator 7 outputs is inputted into the signal input edge of a lighting device 4, and it is a change-over switch SW2. If a traveling contact is connected to a stationary contact b, the control signal which a comparator 7 outputs will not be outputted to a lighting device 4, but the signal input edge of a lighting device 4 will be connected to a gland.
[0058] Switch SW1 Change-over switch SW2 It interlocks and is a switch SW1. When it is an ON state, it is a change-over switch SW2. It connects with a stationary-contact b side, and a traveling contact is a switch SW1. When it is an OFF state, it is a change-over switch SW2. A traveling contact is connected to a stationary-contact a side. Next, actuation of this operation gestalt is explained in full detail.
[0059] It is a switch SW1 first. OFF connects the outgoing end of the power control section 2 to the signal input edge of a lighting device 4. In this case, it becomes the same circuitry as the operation gestalt 1, and succeeds in the same actuation. Since the explanation of operation in this case is the same as the operation gestalt 1, explanation is omitted. Subsequently, switch SW1 When turned on, it interlocks and is a change-over switch SW2. A traveling contact is connected to a stationary-contact b side, and, for this reason, the signal input edge of a lighting

device 4 serves as "L" level. That is, the width of face of a control signal serves as zero, and a lighting device 4 carries out the all-points LGT of the lighting load 5. In this case, it will be supplied from the power feed zone 3 and the emergency power feed zone 15, and will succeed in sufficient electric power supply to carry out the all-points LGT of the lighting load 5.
[0060] That is, the lighting system which has outdoor daylight and correlation according to this operation gestalt is a switch SW1. By making it turn off, it can realize and is a switch SW1. The system by which a user can choose the mode of an all-points LGT regardless of outdoor daylight can be constituted by turning on. What is necessary is just to use the power circuit which consists of a source power supply and a rectifier as an emergency power feed zone 15, using a solar battery as the light sensing portion 1 and the power feed zone 3 of a **** operation gestalt. Of course, it is not limited to this configuration.
[0061] (Operation gestalt 5) the form which drawing 8 shows this operation gestalt and adds this operation gestalt to the system of the operation gestalt 1 -- ** -- the system which consists of lighting load 5' turned on by the emergency power feed zone 15, the constant illuminance lighting device 47, and this constant illuminance lighting device 47 is formed, and the lighting system of this invention is built by both [these] systems.
[0062] Next, actuation of this operation gestalt is explained in full detail. First, since the same part (inside of Frame X) as the operation gestalt 1 in drawing 8 achieves the same function, it omits explanation. Lighting power is supplied and the constant illuminance lighting device 47 makes lighting load 5' turn on with the power from the emergency power feed zone 15, in the system in Frame Y, so that the illuminance of a lighting region may become fixed.
[0063] Therefore, with this operation gestalt, the illuminance correlated with the quantity of light of the sunlight obtained by the system of Frame X based on the lighting **** fixed illuminance of lighting load 5' of Frame Y will be overlapped. Moreover, if arrangement of lighting load 5' turned on by the lighting load 5 turned on by the lighting device 4 by the system in Frame X and the constant illuminance lighting device 47 in Frame Y can be divided, for example, the lighting load 5 is arranged by the window and lighting load 5' is arranged all over head lining, it will be superimposed on the illuminance correlated with the quantity of light of sunlight by the window, and indoor illuminance amendment can be performed.
[0064] It is good to use the power circuit which consists of a source power supply and a rectifier as an emergency power feed zone 15, using a solar battery as the light sensing portion 1 and the power feed zone 3 of a **** operation gestalt. Of course, it is not limited to this configuration. Drawing 9 shows this operation gestalt and this operation gestalt receives sunlight like the operation gestalt 2. (Operation gestalt 6) The power control section 2 which outputs the control signal for making the lighting load 5 turn on with the lighting power which is connected to the light sensing portion 1 which outputs the signal which has the quantity of light and correlation, and a light sensing portion 1, and has the output signal of a light sensing portion 1, and correlation, While having the power feed zone 3 which supplies power to the lighting load 5 through a lighting device 4 like the modulated light lighting device which makes the lighting load 5 turn on, and this lighting device 4 with the lighting power according to the control signal of the power control section 2 Although it consists of the power level setting sections 8 for setting up beforehand the minimum level of the lighting power of the lighting load 5, the setting section 9 of the power level section 6 of this operation gestalt differs from the case of the operation gestalt 2 at the point which consists of a timer 22, and ROM23 and the D/A transducer 24.
[0065] The data of power level with which the day was set up beforehand are written in ROM23 of the setting section 6, and a timer 22 outputs the read-out address data of ROM23 according to time of day with progress of time of day. That is, the data of power level according to progress of time of day are read from ROM23 every moment, are changed into the voltage signal of an analog by the D/A transducer 24 connected to the outgoing end of ROM23, and are inputted into a comparator 14.
[0066] Next, actuation of this operation gestalt is explained in full detail. First, a timer 22 outputs current time of day in the form of the address data of ROM23, and ROM23 outputs the power level data stored in the specified address. The D/A transducer 24 outputs power level data as a voltage signal of an analog, as for this outputted voltage signal, the reference voltage signal of

the reference voltage wave generating 10 is compared by the comparator 14, and a comparator 14 outputs the signal of the width of face corresponding to the period when the reference voltage signal exceeded the voltage signal from the D/A transducer 24. While the width of face of this signal is larger than the width of face of the control signal outputted from the comparator 7 of the power control section 2, the control signal of a comparator 7 is given to a lighting device 4 through AND circuit 9, and when the width of face of the signal of a comparator 14 becomes smaller than the width of face of the control signal outputted from the comparator 7 of the power control section 2, the signal of a comparator 14 will be given to a lighting device 4 as a control signal through AND circuit 9.

[0067] That is, with this operation gestalt, it can set up with the power level which has written the minimum level of an illuminance in ROM23 beforehand according to time of day, and by the daytime of the day of cloudiness with little light-receiving quantity of light of sunlight, or rain, the lighting power of the lighting load 5 can be controlled based on the power level data from ROM23, and a predetermined illuminance can be secured. In addition, as data of the power level written in ROM23, if it considers as a value with small Nighttime and big day ranges and is the value which simulates the sunrise and sunset at the time of fine weather, respectively at a morning stage transitorium and a stage transitorium in the evening, a desirable illuminance pattern will be obtained. As an especially desirable pattern, that from which brightness serves as max is good during the morning, and it is convenient if 1000 thru/or the indoor illuminance of the range of 5000lx(es) are obtained.

[0068] Moreover, if the LAT is high, the seasonal difference of sunrise time of day will become large, but if sunrise becomes late extremely in winter, it will be thought that it is not desirable for biorhythm adjustment. In such a case, if the standard illuminance change pattern of spring or autumn is set up, the seasonal difference of sunrise time of day can be amended, and a desirable illuminance pattern can be obtained for biorhythm adjustment.

[0069] Drawing 10 graph-izes serially an example of writing-in ROM23 power data. As another example (drawing abbreviation), the set point in the first half of ante-meridian can be made especially high (1000-5000lx), and the set point of subsequent daytime can also be set as the usual indoor brightness (for example, 500lx extent).

[0070] The configuration of the D/A transducer 24 which carries out D/A conversion of the data of the timer 22 which outputs the address of ROM and ROM which wrote in the data of power level with which the day used for this operation gestalt 6 was set up beforehand as time-of-day data, and the power level outputted from ROM23 If it adds to the current-limiting circuit 16 in the operation gestalt 3 and the threshold of the current-limiting circuit 16 is controlled by the output of the D/A transducer 24, the lighting system to which a minimum or the power level to set up is changed by time of day is realizable.

[0071] (Operation gestalt 7) drawing 11 shows the operation gestalt of this invention, this operation gestalt is what made the power feed zone serve a double purpose by light sensing portion 1' which consists of a solar battery which receives sunlight, and the configuration of the power control section 2, a lighting device 4, and the lighting load 5 has the same composition as the operation gestalt 1 so that it may illustrate -- it comes out.

[0072] Next, actuation of this operation gestalt is explained in full detail. When the output power of light sensing portion 1' which consists of a solar battery is smaller than the lighting power which a lighting device 4 supplies to the lighting load 5, the output voltage of light sensing portion 1' which consists of a solar battery declines. The power control section 2 outputs a control signal with the width of face which ****ed in the output power of the solar battery which compares output voltage with the reference voltage of the reference voltage wave generating section 15 according to the light-receiving quantity of light of light sensing portion 1', and constitutes light sensing portion 1' to a lighting device 4.

[0073] When the lighting load 5 controlled by the lighting device 4 as a result has little light-receiving quantity of light to which the output voltage of the solar battery of light sensing portion 1' with which lighting power served as the power feed zone falls, it becomes small, and when there is much light-receiving quantity of light to which the output voltage of light sensing portion 1' rises conversely, the lighting system which becomes large and has the light-receiving quantity

of light of sunlight and correlation can be realized.
(Operation gestalt 8) Drawing 12 shows this operation gestalt, this operation gestalt is what formed the low frequency passage filter (for example, filter which consists of in TAKUTA, a capacitor, etc.) 21 in the output of light sensing portion 1' which served as the power feed zone of the operation gestalt 7, and the power control section 2, the lighting device 4, and the lighting load 5 have the same composition as an example 7 so that it may illustrate.
[0074] It **, and clouds carry out smooth [of the fluctuation of the output voltage of the rapid solar battery resulting from interrupting the sun etc.], and can be prevented from getting across to the power control section 2 and a lighting device 4 with this operation gestalt by forming the low frequency passage filter 21 in the output stage of light sensing portion 1' which consists of a solar battery. That is, according to this operation gestalt, it is the lighting system which has outdoor daylight and correlation, and the lighting system which responsibility is late, carried out and moreover coped with it to change of the transient light-receiving quantity of light can be realized.
[0075] In addition, since actuation of other configurations is the same as the operation gestalt 7, explanation is omitted. By the way, what is necessary is just to install a light-receiving side so that a sunrise direction may be turned to although reference is not made especially by explanation of each operation gestalt about the direction of the light-receiving side of the light sensing portion 1 in the above-mentioned operation gestalten 1-6, or light-receiving Men of light sensing portion 1' who consists of a solar battery in the operation gestalten 7 and 8. What is necessary is just to set a light-receiving side as the Higashikata ** in a simple example. Moreover, what is necessary is just to control light-receiving Men's sense to suit sunrise bearing expected by the season with a calender when the difference of sunrise bearing is remarkable.
[0076] Thus, the example which graph-ized the indoor illuminance obtained serially is shown in drawing 13 . Desirably, if it seems that indoor illuminance maximum serves as 1000-5000lx, it is convenient for biorhythm adjustment. In addition, the axis of ordinate of drawing 13 shows the ratio of the lighting power at the time of making lighting power at the time of an all-points LGT into 100%. The following operation gestalt 9 establishes the means for following the light-receiving side of the above-mentioned light sensing portion 1 automatically by the sun.
[0077] (An operation gestalt 9) The judgment section 26 adds at least in the method of the sun which gives in a control signal to the light-receiving side moving part 25 which consists of a control section which controls rotation of the motor for drawing 14 showing this operation gestalt and this operation gestalt considering the same configuration as the operation gestalt 1 as a basic configuration fundamentally, and carrying out movable [of the light sensing portion 1] so that the light-receiving side of a light sensing portion 1 may be fit for this basic configuration in a solar direction, and a motor, and light-receiving side moving part 25.
[0078] Next, actuation of this operation gestalt is explained in full detail. the output voltage of a light sensing portion 1 inputs at least the method of the sun into the noninverting input edge of the differential amplifier section 27 in the judgment section 26 first -- it both inputs into a sample hold circuit 28. A sample hold circuit 28 holds the output voltage of a light sensing portion 1, and has inputted the output into the reversal input edge of the differential amplifier section 27. The output of the differential amplifier section 27 outputs the output voltage of the current light sensing portion 1, and the output voltage difference of the light sensing portion 1 which carried out sample hold before, and the light-receiving side moving part 25 drives a motor to the location where this output voltage difference serves as max. That is, the light-receiving side of a light sensing portion 1 can be made to follow a solar direction to the location as for which the light-receiving side of a light sensing portion 1 carries out a right pair to the sun.
[0079] In addition, since actuation of configurations other than solar flattery is the same as the operation gestalt 1, explanation is omitted. Moreover, since what is necessary is just to use a means well-known as a movable device of a light sensing portion 1, the illustration about structure and explanation are omitted here.
(Operation gestalt 10) Drawing 15 shows this operation gestalt, and gets down, and this operation gestalt has the description in the point turned in the lantern-light 30 direction which formed the light sensing portion 1 indoors so that it might illustrate, and established the light-

receiving side in the building 29. That is, since it stops having correlation with the illuminance of the lantern-light 30 neighborhood when the direction where the light-receiving sides of a light sensing portion 1 differ in a lantern light 30 is turned to, the lighting system which has the neighboring illuminance of a lantern light 30 and correlation is realizable by turning the light-receiving side of a light sensing portion 1 in the direction of a lantern light 30 like this operation gestalt.

[0080] In addition, since other configurations are the same as the operation gestalt 1 and the actuation is the same as the operation gestalt 1, explanation is omitted.

(Operation gestalt 11) Drawing 16 shows this operation gestalt, and this operation gestalt consists of the power feed zone 3, a lighting device 4, a lighting load 5, and a power control section 31, and has the description in the power control section 31 so that it may illustrate. In addition, the power feed zone 3, a lighting device 4, and the lighting load 5 are the same configurations as the operation gestalt 1.

[0081] That is, the calender timer 32 which clocks a current date to the power control section 31, The timer 33 which clocks current time, and the modulated light data time series database 34, The current time data of the calender timer 32 and a timer 33 are incorporated. The modulated light data operation part 35 which creates the modulated light data given to a lighting device 4 so that the illuminance which read the outdoor daylight data corresponding to that time data from the modulated light data time series database 34, and gave correlation from this outdoor daylight data may be obtained, It consists of the modulated light data output sections 36 which output the control signal of the width of face corresponding to the control data given from the modulated light data operation part 35 to a lighting device 4.

[0082] As a modulated light data time series database 34, here on what [month / what] in the data table which described what kind of brightness outdoor daylight (sunlight) would serve as when in how many minutes based on known measurement data etc. Or it consists of a data table which described the sunrise for every day, and the outdoor daylight data of sunset time of day and the pattern data of brightness change of outdoor daylight beforehand average [from sunrise to sunset]. In the case of the former, the modulated light data operation part 35 uses the data read as it was, and asks for the outdoor daylight data of current time by reading both data in the case of the latter, and performing the operation (multiplication) based on both data.

[0083] It **, and with this operation gestalt, based on the outdoor daylight data of the current time obtained from the modulated light data time series database 34, the power control section 31 generates the control signal for the modulated light at the time, and gives to a lighting device 4. In this case, the modulated light data operation part 35 creates control data so that a lighting control pattern which serves as an illuminance higher than the average illumination of the morning or an afternoon at least in the account illuminance of predetermined period Nakamae before and behind noon may be obtained.

[0084] Although many things are considered about a lighting control pattern here, with this operation gestalt, it adopts [for the purpose of following lighting control Batang]. That is, as a lighting control pattern, as shown in drawing 17 (a), apply to noon from sunrise and an illuminance is raised linearly. The fundamental pattern according to natural light change to which an illuminance is linearly reduced from noon to sunset, Furthermore, as shown in drawing 17 (b), the account illuminance of predetermined period Nakamae before and behind noon is made into a fixed illuminance higher than the average illumination of the morning or an afternoon. As shown in the pattern which aimed at maintenance of the vigilance by the bright light of daytime, and improvement, and drawing 17 (c), after sunset based on the pattern of drawing 17 (b) as a fixed illuminance The break period which made the illuminance low is set up at the pattern it is made not to cause trouble to the actual activity after sunset, and also the stage when the fall of the vigilance of past noon occurs based on Batang of drawing 17 (c) as shown in drawing 17 (d). subsequent working efficiency is shown in the pattern and drawing 17 (e) which are raised more -- as -- a change linear based on the pattern of drawing 17 (c) -- a logarithm -- it changes into change of-like and there is a pattern brought more close to natural light change.

[0085] Furthermore, as shown in drawing 18 (a), drop an illuminance with constant speed from near noon to the predetermined time of day in front of sunset, and an after that predetermined

illuminance is maintained. The pattern with which it was made for the light of ante-meridian to become effective in adjustment of biorhythm, and recovery maintenance of day ranges, Moreover, as shown in drawing 18 (b), while aiming at [the illuminance climbing speed of ante-meridian] the effectiveness of drawing 18 (a) for the lowering speed of the illuminance of an afternoon as smallness in size based on the pattern of drawing 18 (a) The pattern which made recovery maintenance easy to carry out, the pattern which made recovery maintenance easier to give fluctuation of an illuminance at the fixed illuminance period of the pattern of drawing 18 (b), and to carry out as shown in drawing 18 (c) further again, Moreover, there is a pattern which makes a climbing speed sudden for a lowering speed gently in the part [drawing 18 / (c)] of fluctuation as shown in drawing 18 (d), and confirms improvement in vigilance more. In this case, the direction periodically made more into random as a fluctuation part was shown in drawing 18 (e) becomes [adaptation] few effective by vigilance maintenance.

[0086] Moreover, in the lighting of a workplace, there is a pattern which shows commencement-of-work time of day to drawing 19 (a) thru/or drawing 19 (d) made into the starting point. In this case, the pattern and drawing 19 (c) which drawing 19 (a) maintained during the morning uniformly with the high illuminance, and the pattern to which the afternoon changed the illuminance in proportion to outdoor daylight, and drawing 19 (b) gave width of face to fixed illuminance time amount, and set up the rest period, and (d) are the turns which used the pattern of drawing 17 (a) and drawing 18 (a) as the model.

[0087] The pattern which became possible [setting up the lighting control pattern of arbitration], and fitted the location to illuminate, and the pattern in consideration of biorhythm can be realized without **(ing), and actually receiving sunlight according to this operation gestalt. When daylight-hours bands differ in **** and winter, it is not necessarily good to reproduce change of the natural light faithfully. It may be made to set the date change by the summer solstice or winter solstice a core [the vernal equinox and the autumnal equinox] to one half, using output width of face of the calender timer 33 of the power control section 31 as one half there.

[0088] Or you may make it take out the sunrise of the modulated light data time series database 34, and the data of sunset time of day per two days. furthermore, a lighting user's favorite season is set up and you may make it output the lighting control pattern which boils the illuminance change according to the season, and corresponds

(Operation gestalt 12) the configuration which controls the lighting power of basic lighting load 5a attached in head lining etc. through the lighting device 4 with the control signal of the power control section 31 used with the operation gestalt 11 so that drawing 20 may show this operation gestalt and this operation gestalt might be illustrated -- in addition It has composition which controls the lighting power of task lighting load 5b, such as a personal desk stand, and a personal spotlight, down RAIDO, by the control signal of the power control section 39 through a lighting device 40. According to the width of face of the control signal which a lighting device 40 is the thing of the same configuration as a lighting device 4, and is outputted from the power control section 39, the lighting power of lighting load 5b can be controlled, adjustable [of the illuminance of the lighting region of task lighting load 5b] can be carried out, and lighting power is supplied through ON/OFF control section 38 here from the power feed zone 3. It turns on/turns off by the distinction signal of the distinction section 42 which distinguishes ON / off important point of task lighting, and needlessness based on the detection output of the taking-a-seat situation detecting element 41 which detects taking-a-seat situations, such as a selection signal of task lighting ON / off manual selection section 37, or a desk, the power from the power feed zone 3 is supplied to a lighting device 40 at the time of ON, and ON / off control section 38 intercepts at the time of OFF. Switch SW0 It is a switch for making change-over selection of the signal linked to ON / off control section 38 from the selection signal of task lighting ON / off manual selection section 37, and the distinction signal of the distinction section 42.

[0089] The modulated light data operation output section 46 to which the power control section 39 made one the modulated light data operation part and the modulated light data output section in the power control section 31 of an example 14, The database 45 which stores the lighting control pattern of vigilance maintenance, The individual humanity news which uses task lighting,

and the input section 43 for personal pattern selection, Consist of a timer 44 which clocks current time, and the modulated light data operation output section 46 reads the modulated light data which correspond based on the current time data from a timer 44 with a database 45. Based on individual humanity news or the contents of personal pattern selection, the control signal of predetermined modulated light level is generated, and this data is outputted.

[0090] Since the power control section 31 of a **** operation gestalt is the same as the power control section 31 of an example 11, the explanation about a configuration and actuation is omitted. while it ** and the control signal from the power control section 31 performs illumination control of basic lighting load 5a of the whole interior of a room like the operation gestalt 11 in the case of this operation gestalt -- taking-a-seat condition -- or it can carry out to the control signal outputted from the power control section 39 by lighting control pattern to which maintenance of vigilance is given to and illumination control of personal task lighting load 5b is made as for things if needed.

[0091] As a **** operation gestalt shows to drawing 21 (a), with the lighting by basic lighting load 5a The basic illuminance which maintains a fixed illuminance and is kept constant from sunset with a still lower illuminance from sunrise to sunset is obtained. By obtaining the illuminance which correlated control of the lighting power of task lighting load 5b with change of outdoor daylight (sunlight) as shown in drawing 21 (b), lighting with the illuminance change with outdoor daylight and correlation can be performed. In this case, since lighting which gave illuminance change correlated with change of outdoor daylight can be performed upwards for every individual and the illuminance by basic lighting load 5a can be made low, power consumption can be lessened.

[0092] Moreover, as shown in drawing 21 (c), with the lighting by basic lighting load 5a, illuminance change is obtained so that it may become the pattern of drawing 17 (d) from sunrise to sunset, and control which gives fluctuation as shown in drawing 21 (d) also becomes possible with this operation gestalt about control of the lighting power of task lighting load 5b. Control of a task lighting load is possible also for control called drawing 21 (d) at that it is drawing 21 (b) and (it being equivalent to drawing 17 (b)), and illuminance change of a basic lighting load can reproduce the illuminance change on the 1st roughly with basic lighting, and can make a recovery maintenance pattern superimpose with task lighting .

[0093] In addition, the lighting loads shown by the above-mentioned operation gestalt 1 thru/or 12 may be two or more lamps, or may be 1 one lamp, and, in two or more cases, a multi-LGT lighting device is used as a lighting device. Moreover, when putting side by side two or more lighting devices, a power control section and the power output section may be shared.

(Operation gestalt 13) This operation gestalt starts the lighting system suitable for the place where a lighting user slack operator's work site is being fixed, for example, a work room, (office), the workplace where works are being fixed, the monitor room where the direction and the monitoring station of the object to supervise are being fixed.

[0094] Drawing 22 shows the configuration of this operation gestalt. The lighting system of this operation gestalt In order to give the lighting device 52 the general lighting instrument 49 equipped with the light source used as the basic lighting load installed in order to secure a necessary minimum illuminance, and for general lighting instrument 49, and the illuminance needed for the lighting user M Local lighting instrument 50a-- equipped with the task lighting load slack light source which is installed one or more pieces if needed, and irradiates the inside of the lighting user's M visual field, such as a downlight and a spotlight, Lighting-device 51a-- equipped with the modulated light function corresponding to each local lighting instrument 50a--, The control section 54 which gives the control data which carries out modulated light control so that it may become quantity of light change which mentions each local lighting instrument 50a-- later to each point LGT equipment 51a--, It consists of the quantity of light change information generating section 56 which generates the quantity of light change information for creating control data by the control section 54, and a power-source slack power feed zone 55, and arranges in the head-lining section 53 including each lighting fitting 49 and 50a--.

[0095] Drawing 23 shows the circuitry of this operation gestalt. The quantity of light change information generating section 56 Based on time of day, modulated light data are called from a

modulated light data time series database like the operation gestalt 11. the time check of a timer or a calender timer -- quantity of light change information being generated, or Or it is the thing equipped with the function to generate quantity of light change information based on the detection information on the sensor which detects the brightness of outdoor daylight. Transition of change of the quantity of light of sunlight and the quantity of light change information that it corresponds are given to a control section 54, and a control section 54 creates the modulated light data based on the quantity of light change information from this quantity of light change information generating section 56 as control data, and gives them to lighting-device 51a--. In this case, the modulated light data created are local lighting instrument 50a so that the illuminance of the lighting region irradiated by local lighting instrument 50a-- so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset may be changed and it may become a high illuminance from the average illumination of the morning or an afternoon at least about the account illuminance of predetermined period Nakamae before and behind noon. -- It is set up so that light source La-- for local lighting may be controlled.

[0096] Moreover, a control section 54 supplies the power from the power-source slack power feed zone 55 to each local lighting instrument 50a-- through each point LGT equipment 51a--. In addition, the power source corresponding to the general lighting instrument 49 is given from another power feed zone (not shown). Of course, the above-mentioned power feed zone 55 may be shared. lighting-device 51a-- performs lighting/putting out lights based on the control data from a control section 54 by actuation of switch SWa-- for local lighting to light source La[of local lighting instrument 50a--] -- which boils, respectively and has been prepared while controlling lighting power and modulating the light.

[0097] When the desk 57 grade in which it ** and the operator slack lighting user M works with this operation gestalt must be most illuminated with a low illuminance When it illuminates only with the general lighting instrument 49 and the lighting user M needs an illuminance higher than it By turning on switch SWa-- for local lighting prepared in each corresponding local lighting instrument 50a-- Add the lighting by local lighting instrument 50a--, such as a downlight and a spotlight, to the lighting of the general lighting instrument 49, and the illuminance by the local lighting instrument 50a-- concerned by controlling by the control section 54 It can be set as the illuminance which needs the illuminance of the lighting region (inside of the lighting user's M visual field) by local lighting instrument 50a--. While changing this illuminance here so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset, lighting which suited the lighting user's M biorhythm like each above-mentioned operation gestalt can be performed by changing the account illuminance of predetermined period Nakamae before and behind noon at least, so that it may become an illuminance higher than the average illumination of the morning or an afternoon. In addition, although local lighting instrument 50a-- is arranged in the head-lining section 53 with the configuration of drawing 22 , you may install in the partition 59 with which the desks 57 and 57 which face as shown in drawing 24 are divided. However, local lighting instrument 50a-- is the light source La about the panel 58 of an optical diffusion mold in this case. -- Reality is accepted by carrying out attaching in a front face etc., and it is made not to be unpleasant glare. the component which has drawing 22 and the same role as the component of drawing 23 since the role of the circuitry in the example of drawing 24 and the general lighting instrument 49 is the same as that of **** -- being alike -- the same number and a notation are attached and explanation is omitted. In addition, the power-source slack power feed zone 55 is formed respectively corresponding to the lighting device 52 for general lighting, and the lighting devices 51a and 51b for local lighting.

[0098] Furthermore, although above-mentioned local lighting instrument 50a-- was a configuration arranged to the head-lining section 53 or party SHON 59, it may constitute the local lighting instrument 50 from an instrument of the stand mold laid on a desk 57 as shown in drawing 25 thru/or drawing 27 again. While changing the brightness within the lighting user's M visual field (illuminance) also in this case so that it may correspond as mentioned above with transition of change of the quantity of light of the sunlight from sunrise to sunset It is the same as the example of drawing 22 (drawing 23) and drawing 24 that it is natural and in circuitry to

perform modulated light control to the local lighting instrument 50 so that the account illuminance of predetermined period Nakamae before and behind noon may be made into an illuminance higher than the average illumination of the morning or an afternoon at least.
[0099] However, as shown in drawing 26 , even if attaching in the front face of the light source L etc. accepts reality by carrying out panel 58' of a transparency diffusion mold in this case, it is made not to be unpleasant glare. In addition, 60 in drawing 26 is the case of an instrument, and 61 is a reflecting plate. Moreover, lighting fitting which has the configuration of a functional change-over so that it can be used also for the usual stand, as shown in drawing 28 (a) thru/or (c), and drawing 29 (d) as a local lighting instrument 50 may be used.
[0100] Lighting fitting to illustrate puts the panel 58 of a diffusion mold on front opening, and has structure supported pivotably free [bending forward] by the pivot 109 which prepared the front lower-limit both sides of the box-like stand section case 101 which contained a reflecting plate 100 and the light source L in the interior in the kickback edge both sides of susceptor 102, and the stand section case 101 and susceptor 102 have contained to the receipt crevice 103 as for which the front face of formation **** and the top face carried out opening to the partition 59 mentioned above. The projection 104 for a guide formed in the vertical location of the posterior part of the both-sides side face of the stand section case 101 here, It inserts in free [vertical migration] in the guide crevice 106 of the vertical direction which formed both projections 104 and the projection 105 for a guide prepared in the both-sides side face of the susceptor 102 on the same line in the posterior part of the both-sides internal surface of the receipt crevice 103. Moreover, it has inserted in the guide crevice 108 which formed the projection 107 for a guide prepared in the anterior part of the both-sides side face of susceptor 102 in the anterior part of the both-sides internal surface of the receipt crevice 103 so that it might be concurrent with the guide crevice 106 free [vertical actuation].
[0101] In **(ing) and using lighting fitting as a local lighting instrument 50 in this invention lighting system, as shown in drawing 29 (a), the lower limit location of the guide crevices 106 and 108 has the projections 104, 107, and 108 for a guide of the both-sides side face of susceptor 102, and it sets to the condition that the stand section case 101 was contained in the receipt crevice 103, and the stand section case 101 was ****(ed) on susceptor 102. In this case, the light which comes out of the light source L irradiates the front of a partition 59 through a panel 58.
[0102] Next, when using it as usual stand lighting, it is made to move to the location (drawing 29 (b)) where the guide projections 104 and 104 escape from upper limit opening of the guide crevice 106 up, it comes out, and the projection 107 for a guide collides with the upper limit of the guide crevice 108 the condition shown in drawing 29 (a) to the stand section case 101. As the SUNTANDO case 101 is counterclockwise rotated in drawing focusing on a pivot 109 from this condition and it is shown in drawing 29 (c), the SUNTANDO case 101 is bent forward and it considers as a condition. The front-face section of a lower limit of the stand section case 101 which serves as the back end inferior-surface-of-tongue section in drawing 29 (c) here will be ****(ed) and supported on the susceptor 110 which is making it project ahead from front opening of the receipt crevice 103 with the top face which turns into a top face of the above-mentioned susceptor 102, and the same Men.
[0103] If the projection 105,107 for a guide of susceptor 102 moves the stand section case 101 downward to the lower limit location of the guide crevice 106,108 in this condition, the stand where the lighting direction serves as facing down (the direction of a desk top face) will be constituted.
This operation gestalt is set to the system configuration of drawing 22 of the operation gestalt 13. (Operation gestalt 14) It is the system which added feeling sensor section of man 62a-- which consists of a heat ray sensor which can recognize existence of the lighting user M as shown in drawing 30 . Many lighting users M exist in the room, and the lighting user's M work site is being fixed. The lighting user M does not frequently use the location, and it is made suitable for a workplace, a work room (office), etc. where the timing when not considering as the time of using it by the lighting user M differs.
[0104] Drawing 31 shows the circuitry of this operation gestalt, and feeling sensor section of

man 62a-- which consists of a heat ray sensor etc. that there is the lighting user M near [within the visual field which local lighting instrument 50a-- is going to irradiate] detects. Modulated light control action is performed to local lighting instrument 50a-- to which lighting-device 51a-- (or control section 54) of local lighting instrument 50a-- which corresponds the detection signal which was sent to lighting-device 51a-- (or control section 54), and received the signal corresponds. That is, when a detection signal is sent to lighting-device 51a--, the control data from a control section 54 is confirmed, and the lighting-device 51a-- concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting-device 51a-- concerned which received delivery and this control data for the control data performs modulated light control to lighting-device 51a-- to which a control section 54 corresponds to corresponding local lighting instrument 50a--.

[0105] In addition, the same number and a notation are given to the component which succeeds to drawing 22 and drawing 23 in the same configuration and the same actuation fundamentally in the component shown in drawing 30 and drawing 31 , and explanation is omitted. Moreover, especially the power-source slack power feed zone corresponding to the general lighting instrument 49 and a lighting device 52 does not illustrate, but is omitted. While making it change so that it may ** and the brightness within the lighting user's M visual field (illuminance) may be corresponded as mentioned above like [modulated light control of this operation gestalt] the operation gestalt 13 with transition of change of the quantity of light of the sunlight from sunrise to sunset At least, modulated light control of the account illuminance of predetermined period Nakamae before and behind noon is carried out so that it may become an illuminance higher than the average illumination of the morning or an afternoon, and lighting which suited the lighting user's M biorhythm is performed.

[0106] Moreover, according to this operation gestalt, only the inside of the visual field of the lighting user M who is working can perform lighting by local lighting instrument 50a--.

(Operation gestalt 15) this operation gestalt adds feeling sensor section of man 62a-- which can recognize existence of the lighting user M as shown in drawing 32 and drawing 33 to each local lighting instrument 50a-- of every -- both It is the system of feeling sensor section of man 62a-- which prepared local lighting instrument 50a-- in which the direction-of-radiation adjustable is free based on the detection signal, and it is the the best for the activity and work room where the lighting user's M work site is not fixed, and suitable for the work room (office) which changes arrangement of a conference room and a desk etc. frequently. In addition, although drawing 32 shows only one local lighting instrument 50a, according to an installation, more than one are prepared like the above-mentioned operation gestalten 13 and 14.

[0107] Feeling sensor section of man 62a-- used with this operation gestalt consists of an image-processing sensor using CCD which can recognize existence of the lighting user M and a location etc., and as shown in drawing 33 , local lighting instrument 50a-- is equipped with the direction-of-radiation adjustable motors MT1 and MT2 for local lighting, drives them by these motors MT1 and MT2, and it consists of lighting fitting which can carry out adjustable [of the direction of radiation] freely like the after-mentioned.

[0108] The direction-of-radiation adjustable motors MT1 and MT2 for local lighting are controlled by direction-of-radiation control-section 63a-- for local lighting prepared corresponding to each. Direction-of-radiation control-section 63a-- for local lighting is local lighting instrument 50a of corresponding feeling sensor section of man 62a-- which corresponds based on the lighting user's M location detection information. -- The direction of radiation controls rotation of the direction-of-radiation adjustable motors MT1 and MT2 for local lighting to become in the lighting user's M visual field.

[0109] In addition, since other configurations are fundamentally the same as the operation gestalt 13, the same number and a notation are given to the same component as the component shown by drawing 22 and drawing 23 , and explanation is omitted. Lighting-device 51a (or control section 54) which received delivery and its detection signal performs modulated light control action to lighting-device 51of local lighting instrument 50a to which the feeling sensor section of man which **(ed) and detected lighting user M with this operation gestalt, for example, 62a, corresponds the detection signal a (or control section 54) to corresponding local lighting

instrument 50a. That is, when a detection signal is sent to lighting-device 51a, the control data of the modulated light from a control section 54 is confirmed, and the lighting device concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting-device 51a concerned which received delivery and this control data for the control data performs modulated light control to lighting-device 51a to which a control section 54 corresponds to corresponding local lighting instrument 50a.
[0110] Feeling sensor section of man 62a sends the lighting user's M detection positional information to the above-mentioned modulated light control and coincidence at direction-of-radiation control-section 55a for local lighting of local lighting instrument 50a. Direction-of-radiation control-section 55a for local lighting which received detection positional information controls rotation of the direction-of-radiation adjustable motors MT1 and MT2 for local lighting, and changes the direction of radiation of local lighting instrument 50a so that local lighting instrument 50a may illuminate the inside of the lighting user's M visual field.
[0111] As shown in drawing 34 (a) thru/or (d) as local lighting instrument 50a-- used for this operation gestalt here, lighting fitting of a downlight mold is used. The case 66 with which the top-face core is being fixed to the driving shaft 65 of a motor MT 1 so that a rotation drive may be horizontally carried out by the motor MT 1 which this lighting fitting was contained in the closed-end cylindrical external instrument attaching part 64 and this external instrument attaching part 64, and was formed in the top face of the external instrument attaching part 64, The lighting fixture 67 which has been arranged in this case 66, and has been arranged so that the end section may rotate perpendicularly with the driving shaft (not shown) of Motor MTb, It becomes the reflecting plate 68 arranged inside the other end of this lighting fixture 67 from the light source L, and the power-source line 69 of motors MT1 and MT2 is connected at corresponding direction-of-radiation control-section 55a-- for local lighting, and the power-source line 70 from the light source L is connected to corresponding lighting-device 51a--.
[0112] Direction-of-radiation control-section 55a for local lighting which **(ed) and received the above-mentioned feeling sensor section of a man, for example, the detection positional information from 62a While rotating the direction of an arrow head which performs the roll control of a motor MT 1 and shows a case 66 to drawing 34 (b), i.e., a horizontal direction, and making the location of a lighting fixture 67 correspond in the lighting user's M existence direction The roll control of a motor MT 2 is performed, the direction of an arrow head which shows a lighting fixture 67 to drawing 34 (d), i.e., a perpendicular direction, is rotated, and an adjustable setup of the illuminating angle of a reflecting plate 68 and the light source La is carried out so that the inside of the lighting user's M visual field may be irradiated.
[0113] It is local lighting instrument 50a so that only the inside of the lighting user's M visual field may be irradiated with this operation gestalt as mentioned above by the positional information of the lighting user M who is working. -- Since the direction of radiation is changed automatically Even if the person M for Akitoshi is working in a different location from before, while making it change so that it may correspond with transition of the change of the quantity of light of the sunlight from sunrise to sunset by the brightness within the lighting user's M visual field (illuminance) The account illuminance of predetermined period Nakamae before and behind noon is controllable at least to become an illuminance higher than the average illumination of the morning or an afternoon.
[0114] (Operation gestalt 16) With the above-mentioned operation gestalt 15, it is based on the lighting user's M positional information which feeling sensor section of man 62a-- detected, and is local lighting instrument 50a. -- Although he was trying to control the direction of radiation With this operation gestalt, remote control signal light sensing portion 72a-- which is the receiving means which attached the remote control signal transmitted from the remote control transmitter 71 which the lighting user M has as shown in drawing 35 , and which used light, such as infrared radiation, as a signal medium to local lighting instrument 50a-- as shown in drawing 36 , for example receives light. The direction of radiation is set up for every send channel, that is, the send channel has been direction-of-radiation information, and a remote control signal is sent to direction-of-radiation control-section 63a-- for local lighting which judges the direction of radiation according to the channel of the remote control signal which received light, and

corresponds the information on the direction of radiation by remote control signal light sensing portion 72a-- here. Therefore, arrangement of the activity and work room where the lighting user's M work site is not fixed like the operation gestalt 15, a conference room, and a desk etc. is suitable for the work room (office) which changes frequently. If the operating button of the transmission channel which corresponded so that it might ** and the lighting user M might become in his visual field about the direction of radiation of a local lighting instrument with this operation gestalt is operated, for example, a remote control signal is transmitted toward local lighting instrument 50a The signal which shows that remote control signal light sensing portion 72of local lighting instrument 50a a had light-receiving of a remote control signal to corresponding lighting-device 51a (or control section 54) Delivery, Lighting-device 51a (or control section 54) which received the signal performs modulated light control action to corresponding local lighting instrument 50a. That is, when a detection signal is sent to lighting-device 51a--, the control data of the modulated light from a control section 54 is confirmed, and the lighting device concerned performs modulated light control with this control data. Moreover, when a detection signal is sent to a control section 54, the lighting device concerned which received delivery and this control data for the control data to lighting-device 51a-- corresponding to local lighting instrument 50a to which a control section 54 corresponds performs modulated light control.

[0115] Remote control signal light sensing portion 72a the direction-of-radiation information judged from the receiving channel to direction-of-radiation control-section 55a for local lighting of local lighting instrument 50a corresponding to the above-mentioned modulated light control and coincidence Delivery, Direction-of-radiation control-section 55a for local lighting controls rotation of motors MT1 and MT2, and changes the direction of radiation of local lighting instrument 50a so that it may irradiate with the illuminance needed in the lighting user's M visual field based on the direction-of-radiation information from remote control signal light sensing portion 72a.

[0116] Lighting fitting of the downlight mold shown in drawing 37 (a) which has the same configuration as the configuration of drawing 34 substantially as local lighting instrument 50a-- used with a **** operation gestalt thru/or (d) is used. A point which is different from local lighting instrument 50a-- of this operation gestalt with local lighting instrument 50a-- of drawing 34 here is a point of having formed the remote control light sensing portion 72 in the case 66, and it is drawn outside from the upper part of the external instrument attaching part 64 so that the signal line 73 from this remote control light sensing portion 72 may be sent to the corresponding direction-of-radiation control section 63 for local lighting. In addition, since other configurations are the same as the configuration of drawing 34 , the same number and a notation are given to the same component, and explanation is omitted.

[0117] Direction-of-radiation control-section 55a-- for local lighting which **(ed) and received direction-of-radiation information from remote control signal light sensing portion 54a-- performs the roll control of motors MT1 and MT2, and carries out an adjustable setup of the sense and illuminating angle of a lighting fixture 67 like the case of an example 15. As mentioned above, with this operation gestalt, the direction of radiation is chosen for lighting user M itself so that only the inside of the visual field of the lighting user M who is working may be irradiated. By [of local lighting instrument 50a--] changing the direction of radiation Even if the lighting user M is working in a different location from before, while making it change so that it may correspond with transition of the change of the quantity of light of the sunlight from sunrise to sunset by the brightness within the lighting user's M visual field (illuminance) At least, the account illuminance of predetermined period Nakamae before and behind noon can be set up so that it may become an illuminance higher than the average illumination of the morning or an afternoon.

[0118] In addition, although the information transmitted from the remote control transmitter 71 with the above-mentioned configuration was direction-of-radiation information which shows the direction of radiation set up beforehand, if it is made to send from the remote control transmitter 71 by making into direction-of-radiation information the actuation signal of local lighting instrument 50a-- which operates a motion by remote control using actuation means, such as Joyce TEIIKU, the direction of radiation can be set up in the optimal direction by the own

actuation of lighting user M.
(Operation gestalt 17) So that it may be in an active state immediately, after it uses this operation gestalt after getting up in the morning before going out for the purpose, such as work, and going out space, such as a washroom where it is required that human being who uses should be awoke, a dining room, and the door, -- or it carries out hypnagogic, by the time it carries out It is a lighting system suitable for the lighting for residences, such as space demanded, that being relaxed by human being who uses adjusts [for the purpose of the biorhythm of those who use / living room / which is demanded].
[0119] The lighting device 51 equipped with the function which carries out modulated light control of one or more lighting fitting 80 and these lighting fitting 80 which can irradiate the inside of the visual field of the lighting user M installed in the washroom 74 as the lighting system of this operation gestalt was shown in drawing 38 , It consists of a sensor which detects the timer for creating the data to which the quantity of light of a luminaire 80 is changed so that it may correspond with transition of change of the quantity of light of the sunlight from sunrise to sunset, or the brightness of outdoor daylight. It consists of the quantity of light change information generating section 56 which outputs quantity of light change information [**** / transition / of change of the quantity of light of sunlight], a control section 54 which creates modulated light data in response to quantity of light change information, and is sent to a lighting device 51 as control data, and a power feed zone 55.
[0120] With this operation gestalt, if the lighting switch SW is turned on, a control section 54 will irradiate the visual field of human being who performs modulated light control and uses control data so that the quantity of light of lighting fitting 80 may turn into the target quantity of light based on the control data in delivery and a lighting device 51 by the illumination light of lighting fitting 80 at a lighting device 51 based on the quantity of light change information acquired from the quantity of light change information generating section 56. However, the lighting fitting 80 of this operation gestalt has covered the light source by the opaque white panel which diffuses light so that an unpleasant glare may not be sensed in the condition of irradiating the maximum quantity of light, even if it faces lighting fitting 80 squarely.
[0121] Usually, since a washroom 74 is located in the location into which daylight cannot go easily in a house, such the sufficient quantity of light does not have it that recovery level is raised. Therefore, even if it went into the washroom 74 for washing a face, preparing hair, etc., the present condition was that recovery level is not mostly different from the condition after occurring. however, in the lighting system of this operation gestalt in this washroom 74 For example, the quantity of light of the target lighting fitting 80 is changed by quantity of light change of outdoor daylight, and quantity of light change which gave correlation. for example, after getting up in the morning, when actions, such as washing a face in a washroom 74 and preparing hair, are done Since it occurs by carrying out modulated light control of the lighting fitting 8, and irradiating the lighting user's M visual field and there is also no between so that it may become the quantity of light which gives an arousal effect, even if it is in the condition that recovery level has fallen, it can be made to be able to awake, and the effectiveness of gathering future activity effectiveness can be given to the lighting user M.
[0122] on the other hand, when doing actions, such as going home and washing a hand in a washroom 74, and gargling By carrying out modulated light control so that the quantity of light of a luminaire 80 may be irradiated on low illuminance level compared with a morning or day ranges That there is no excessive arousal effect **** which is not needed at the time of going home which does not give dazzle to the eye which has adapted itself to dark conditions, such as walking the dark inside at the time of sunset, and going home, etc. can lower the vigilance of those who use before hypnagogic, after going home, and it can bring it to the relaxation condition desired before hypnagogic. [it]
[0123] Moreover, the biorhythm of those who use by changing the quantity of light of lighting fitting by the quantity of light change at the time of the night which lowers vigilance can adjust in the morning which goes home a morning quantity of light change which a night shift etc. raises vigilance to the time amount to which the usual man is sleeping, and raises vigilance at the night at the time of going out of bringing to an active state going to a station to those who are

demanded so that it may work at night.
[0124] As stated above, by the lighting system of this operation gestalt, the lighting user's M biorhythm can be adjusted by performing quantity of light change according to the purpose so that the target biorhythm may be suited.
(Operation gestalt 18) The lighting system of this operation gestalt The feeling sensor section 62 of a man which senses existence of the lighting user M as shown in drawing 39 is added. The detection information on whether the lighting user M outputted from the feeling sensor section 62 of a man exists is received. Based on the detection information, when the lighting user M exists, it is what formed the control section 54 equipped with the function to make the target lighting fitting 80 turn on by the lighting device 51 with a modulated light function, for example, it is installed in the door 75.
[0125] If the feeling sensor sections 62 of a man, such as infrared sensing, detect the thing to which Man M exists in the exposure field of the lighting fitting 80 which it **(ed) and was installed in the door 75 with this operation gestalt and to exist A control section 54 receives the detection information, and when detected as Man M existing, based on the quantity of light change information acquired from the quantity of light change information generating section 56 constituted like the operation gestalt 15, a control section 54 creates control data and sends it to a lighting device 51. Based on the control data which the lighting device 51 received, modulated light control of the lighting fitting 80 is carried out, and the lighting user's M visual field is made to irradiate with the target quantity of light. When detected as on the other hand the lighting user M not existing, the lighting device 54 from which the control section 54 received delivery and the signal of the putting out lights for the signal of putting out lights to the lighting device 51 makes lighting fitting 80 switch off.
[0126] since [by the way,] the door 75 is usually located in the location into which daylight cannot go easily in a house -- recovery level -- raising -- ** -- even if sufficient quantity of light went into the door 75 for . which is not, therefore morning going out, recovery level was not able to expect the rise. However, the quantity of light change information that quantity of light change and correlation of outdoor daylight were given in the lighting system by this operation gestalt is given to a control section 54 from the quantity of light change information generating section 56. When the lighting user M exists in the door 75 in the morning for going out By irradiating the visual field of those M who do modulated light control and use the quantity of light of the target lighting fitting 80 so that it may become the quantity of light which gives an arousal effect Since it occurs and there is also no between, the lighting user M in the condition that recovery level has fallen can be awoke, and the effectiveness of gathering the activity effectiveness after going out can be given to a lighting user.
[0127] When going home and going into the door from outside, the quantity of light on the other hand, by carrying out modulated light control of the lighting fitting 80 so that it may irradiate on low illuminance level compared with a morning or day ranges It can lower the lighting user's M vigilance to before hypnagogic that there is no excessive arousal effect **** which is not needed at the time of going home which does not give glare to the eye which has adapted itself to dark conditions, such as to walk the dark inside at the time of sunset, and to go home, etc., after going home, and it can bring it to the condition that it is wished before hypnagogic and that it can relax. [it]
[0128] In addition, 55 are a power-source slack power feed zone among drawing 39 .
(Operation gestalt 19) The lighting system of this operation gestalt The general lighting instrument 49 hung from the head-lining section 53 which can be irradiated with the quantity of light more than the minimum quantity of light in the quantity of light needed as shown in drawing 40 , It is prepared on a table 76, consists of local lighting instruments 50 which can irradiate the lighting user M by quantity of light change of outdoor daylight, and quantity of light change which gave correlation, and applies to a dining room (table) 77.
[0129] When it ** and must illuminate with the minimum quantity of light with this operation gestalt, it illuminates only with the general lighting instrument 49. Switch SW0 It is the lighting switch of this general lighting instrument 49, and is this switch SW0. When turned on, a lighting device 52 makes the general lighting instrument 49 turn on with the power from power-source

slack power feed zone 55'. When an illuminance higher than it is needed, the control section 54 of the local lighting instrument 50 which consists of a stand etc. Based on the quantity of light change information received from the quantity of light change information generating section 56 constituted like the above-mentioned operation gestalten 17 and 18 The control data for changing the quantity of light of the local lighting instrument 50 by quantity of light change of outdoor daylight and quantity of light change which gave correlation is outputted. The lighting device 51 for local lighting which received the control data carries out modulated light control of the local lighting instrument 50 in response to the power from the power feed zone 55 which is a power source so that it may become the quantity of light according to the control data.
[0130] And the inside of the target lighting user's M visual field is illuminated with the quantity of light to need by adding lighting with this local lighting instrument 50 by which modulated light control was carried out. By making the lighting user's M visual field irradiate with the quantity of light which quantity of light change and correlation of outdoor daylight are given, and the quantity of light of the local lighting instrument 50 is changed with this operation gestalt, for example, gives an arousal effect here at the time of breakfast Since it occurs and there is also no between, the man in the condition that recovery level has fallen can be awoke, and the effectiveness of gathering future activity effectiveness can be given to the lighting user M. On the other hand, at the time of the supper after going home, the lighting condition that a meal can be taken in the relaxed condition of being wished at the time of supper can be presented at the time of going home by reducing the quantity of light of the local lighting instrument 50, and making it irradiate on low illuminance level compared with a morning or daytime, such as not giving the excessive arousal effect which is not needed.
[0131] In addition, even if the local lighting instrument 50 covers the light source by the opaque white panel of diffusibility etc. and faces the local lighting instrument 50 squarely, it is made to have not sensed an unpleasant glare.
(Operation gestalt 20) Although each above-mentioned operation gestalt started the lighting system in buildings, such as a building and a residence The high speed bus and sleeping car as for which this operation gestalt runs at Nighttime which reaches the purpose value in the early morning, The lighting system suitable for the vehicle which will work [rises and] and sleep at time of day which is different from the usual life activities after a lighting user's using the airplane used in order to move to the large location of time difference is started, and it is made to apply to an airplane, as shown in drawing 41 .
[0132] The lighting device 51 for carrying out modulated light control of one or more lighting fitting 80 and these lighting fitting 80 which can irradiate the inside of the lighting user's M visual field by quantity of light change with this operation gestalt, It consists of the quantity of light change information generating section 56 with the same configuration as what was used for the operation gestalt 17 thru/or 19, a control section 54 which receives the quantity of light change information from this quantity of light change information generating section 56, and sends control data to a lighting device 51, and a power-source slack power feed zone 55.
[0133] With this operation gestalt, the lighting device 51 which thought delivery and its control data that a control section 54 gives quantity of light change and the correlation of outdoor daylight, and changes the quantity of light of a luminaire 80 based on the information acquired from the quantity of light change information generating section 56 for the control data to the lighting device 51 performs modulated light control so that a luminaire 80 may irradiate the lighting user's M visual field with the target quantity of light. However, the lighting fitting 80 used for this operation gestalt has covered the light source (not shown) by the opaque white panel (not shown) which diffuses light so that an unpleasant glare may not be sensed in the condition of irradiating the maximum quantity of light, even if it faces lighting fitting 80 squarely.
[0134] At the lighting system of this operation gestalt used for the lighting of this airplane inside the plane, by quantity of light change of outdoor daylight, and quantity of light change which gave correlation Even if it is a time of arriving at the location where time difference with an origin is large by changing the quantity of light of the target lighting fitting 80 The visual field of the lighting user M who uses by morning quantity of light change which gives an arousal effect when arrival time is a morning can be irradiated. Therefore, the lighting user M in the condition that

recovery level has fallen for lack of sleep is awoke, and it becomes possible to give the lighting user M the effectiveness of gathering the activity effectiveness in an arrival location. conversely, activity patterns, such as rising, such as going into a hotel immediately after arrival and sleeping by lowering recovery level in night and irradiating the lighting user's M visual field by the quantity of light change at the time of night which is easy to start the activity of night, such as sleep, an activity, and sleep, -- the usual activity pattern of an arrival location -- smooth -- shift -- last -- biorhythm can be adjusted like.

[0135] moreover, when the lighting system of this operation gestalt is applied to the vehicle which arrives at early morning which is usually sleeping, such as a high speed bus By changing the quantity of light and irradiating a lighting user so that a lighting user's recovery level may be raised to bus arrival time Usually, reach the time amount which is sleeping and the recovery level of the lighting user to whom recovery level has fallen is raised to rising and an active state. This (operation gestalt 21) operation gestalt which can adjust a lighting user's biorhythm so that it can shift to the activity after a lighting user gets down from a vehicle reasonable By that that it irradiates with the quantity of light more than the minimum quantity of light in the quantity of light needed as shown in drawing 42 It is the operation gestalt of the lighting system which consists of local lighting instrument 50a-- which consists of a spotlight which can irradiate the inside of a lighting user's visual field by the general lighting instrument 49 and quantity of light change aiming at illuminating the whole inside of the vehicle to cut to homogeneity. For example, it applies to the lighting of an airplane inside the plane.

[0136] When it must illuminate with the minimum quantity of light with this operation gestalt in quantity of light change of outdoor daylight, and quantity of light change which gave correlation, or when the lighting user M does not need such quantity of light change, the inside of the target lighting user's M visual field is irradiated with the quantity of light of only the general lighting instrument 49 by turning OFF lighting switch SWa-- attached to local lighting instrument 50a--. And for needing the quantity of light higher than the quantity of light which it can irradiate with the general lighting instrument 49 when you need quantity of light change of outdoor daylight, and quantity of light change which gave correlation, the lighting user M is local lighting instrument 50a. -- Lighting switch SWa-- is turned ON. In this case, the control data for changing the quantity of light by quantity of light change of outdoor daylight and quantity of light change which gave the correlation based on the quantity of light change information which the control section 54 received from the quantity of light change information generating section 56 is outputted, and lighting-device 51a-- which received that control data carries out modulated light control of local lighting instrument 50a-- so that it may become the quantity of light according to control data. And while being able to illuminate the inside of the target lighting user's M visual field with the quantity of light to need by adding the lighting by this local lighting instrument 50a-- by which modulated light control was carried out, the brightness within the target lighting user's M visual field can be changed by quantity of light change of outdoor daylight, and the quantity of light change with correlation. It is local lighting instrument 50a here. -- The light source is covered by the opaque white panel of diffusibility etc., and even if it faces local lighting instrument 50a-- squarely, it is necessary to make it not sense an unpleasant glare.

[0137] In addition, the quantity of light change information outputted from the quantity of light change information generating section 56 consists of data which carry out modulated light control of local lighting instrument 50a-- like the above-mentioned operation gestalt 22. 52 in drawing is the lighting device of the general lighting instrument 49, and 55 is the power-source slack power feed zone of the whole system.

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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the system configuration Fig. of the operation gestalt 1 of this invention.
[Drawing 2] It is the wave form chart for explanation of operation of a power control section same as the above.
[Drawing 3] It is the explanatory view showing the relation of an outdoor daylight change same as the above and illuminance change.
[Drawing 4] It is the system configuration Fig. of the operation gestalt 2 of this invention.
[Drawing 5] It is the explanatory view showing the relation of an outdoor daylight change same as the above and illuminance change.
[Drawing 6] It is the system configuration Fig. of the operation gestalt 3 of this invention.
[Drawing 7] It is the system configuration Fig. of the operation gestalt 4 of this invention.
[Drawing 8] It is the system configuration Fig. of the operation gestalt 5 of this invention.
[Drawing 9] It is the system configuration Fig. of the operation gestalt 6 of this invention.
[Drawing 10] It is the explanatory view of the illuminance change by the same as the above.
[Drawing 11] It is the system configuration Fig. of the operation gestalt 7 of this invention.
[Drawing 12] It is the system configuration Fig. of the operation gestalt 8 of this invention.
[Drawing 13] It is the explanatory view of the illuminance change by the same as the above.
[Drawing 14] It is the system configuration Fig. of the operation gestalt 9 of this invention.
[Drawing 15] It is the system configuration Fig. of the operation gestalt 10 of this invention.
[Drawing 16] It is the system configuration Fig. of the operation gestalt 11 of this invention.
[Drawing 17] It is the example Fig. of the lighting control pattern used for the same as the above.

[Drawing 18] It is the example Fig. of another lighting control pattern used for the same as the above.
[Drawing 19] It is the example Fig. of other lighting control patterns used for the same as the above.
[Drawing 20] It is the system configuration Fig. of the operation gestalt 12 of this invention.
[Drawing 21] It is the example Fig. of the lighting control pattern used for the same as the above.

[Drawing 22] It is the system configuration Fig. of an example of the operation gestalt 13 of this invention.
[Drawing 23] It is a circuitry Fig. same as the above.
[Drawing 24] It is the system configuration Fig. of the other examples of the operation gestalt 13 of this invention.
[Drawing 25] It is the explanatory view of other examples of the local lighting instrument used for the operation gestalt 13 of this invention.
[Drawing 26] It is the expanded sectional view of the important section of a local lighting instrument same as the above.
[Drawing 27] (a) is the expansion side elevation of a local lighting instrument same as the above. (b) is the expansion front view of a local lighting instrument same as the above.
[Drawing 28] (a) is the horizontal sectional view of the example of others of the local lighting

instrument used for the operation gestalt 13 of this invention. (b) is the front view of a stand section case same as the above. (c) is the side elevation of a stand section case same as the above.
[Drawing 29] It is a use explanatory view same as the above.
[Drawing 30] It is the system configuration Fig. of the operation gestalt 14 of this invention.
[Drawing 31] It is a circuitry Fig. same as the above.
[Drawing 32] It is the system configuration Fig. of the operation gestalt 15 of this invention.
[Drawing 33] It is a circuitry Fig. same as the above.
[Drawing 34] (a) is the perspective view of the local lighting instrument used for the same as the above. (b) is the bottom view of the local lighting instrument used for the same as the above. (c) is the sectional side elevation of the local lighting instrument used for the same as the above. (d) is a sectional side elevation in the condition of having rotated the lighting fixture of the local lighting instrument used for the same as the above.
[Drawing 35] It is the system configuration Fig. of the operation gestalt 16 of this invention.
[Drawing 36] It is a circuitry Fig. same as the above.
[Drawing 37] (a) is the perspective view of the local lighting instrument used for the same as the above. (b) is the bottom view of the local lighting instrument used for the same as the above. (c) is the sectional side elevation of the local lighting instrument used for the same as the above. (d) is a sectional side elevation in the condition of having rotated the lighting fixture of the local lighting instrument used for the same as the above.
[Drawing 38] It is the system configuration Fig. of the operation gestalt 17 of this invention.
[Drawing 39] It is the system configuration Fig. of the operation gestalt 18 of this invention.
[Drawing 40] It is the system configuration Fig. of the operation gestalt 19 of this invention.
[Drawing 41] It is the system configuration Fig. of the operation gestalt 20 of this invention.
[Drawing 42] It is the system configuration Fig. of the operation gestalt 21 of this invention.
[Description of Notations]
1 Light Sensing Portion
2 Power Control Section
3 Power Feed Zone
4 Lighting Device
5 Lighting Load
6 Reference-Waveform Generating Section
7 Comparator

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(71)出願人　000005832
松下電工株式会社
大阪府門真市大字門真1048番地

(72)発明者　小山　恵美
大阪府門真市大字門真1048番地松下電工株式会社内

(72)発明者　岩井　彌
大阪府門真市大字門真1048番地松下電工株式会社内

(72)発明者　片山　就司
大阪府門真市大字門真1048番地松下電工株式会社内

(74)代理人　弁理士　石田　長七　（外２名）

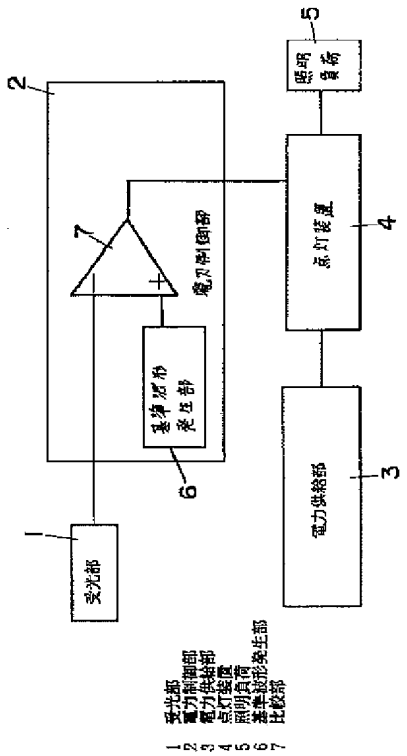
最終頁に続く

(54)【発明の名称】　照明システム

(57)【要約】

【課題】太陽光の光量の推移と相関を持ち、生体リズム調整ができ且つ覚醒度の維持がし易い照明システムを提供することにある。

【解決手段】受光部１は、太陽光の光量と相関（比例）を有する電圧信号を発生する。電力制御部２の比較部７は基準波形発生部６の基準電圧電圧V_0が受光部１からの電圧信号よりも高いときには”Ｈ”の制御信号を出力する。点灯装置４はこの制御信号の幅に応じて照明負荷５の点灯電力（調光度合）を設定する。点灯装置４は入力する制御信号の幅に応じ太陽からの受光光量（外光）の変化に比例して照明対象である屋内の照度が変化するように照明負荷５へ供給する点灯電力を設定する。つまり受光光量が少なくなって制御信号の幅が大きくなるとそれに応じて点灯電力を小さくして照度を低下させ、逆に受光光量が多くなって制御信号の幅が小さくなると点灯電力を大きくして照度を高くするのである。



【特許請求の範囲】

【請求項１】屋内の照明を行う照明負荷と、該照明負荷の点灯を制御して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明負荷で照明される照明域の照度を変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とする点灯制御手段とを備えたことを特徴とする照明システム。

【請求項２】点灯制御手段は、既知の日の出から日没までの太陽光の光量の変化の推移に対応させて予め設定した点灯制御パターンに基づいて照明負荷の点灯を制御することを特徴とする請求項１記載の照明システム。

【請求項３】屋内の照明を行う照明負荷と、太陽光を受光してその光量と相関を有する信号を出力する受光部、受光部の出力信号と相関を有して照明負荷の点灯電力の大きさを設定する電力制御部、該電力制御部で設定される点灯電力で照明負荷を点灯する点灯装置、照明負荷に点灯装置を介して点灯電力を供給する電力供給部からなる点灯制御手段とを備えて成ることを特徴とする照明システム。

【請求項４】予め下限となる点灯電力レベルを設定した電力レベル設定部を備え、電力制御部は受光部の出力信号に対応した点灯電力と電力レベル設定部で設定した点灯電力とを比較して大きい方の点灯電力に対応するように照明負荷の点灯電力の大きさを制御することを特徴とする請求項３記載の照明システム。

【請求項５】電力制御部の制御とは無関係に電力を供給する予備電力供給部と予め下限となる電力レベルを設定した電力レベル設定部とを備え、電力制御部は電力供給部の供給電力が電力レベル設定部で設定したレベルの点灯電力より下回る場合予備電力供給部の電力を電力供給部の供給電力に加算して照明負荷に供給するように制御することを特徴とする請求項３記載の照明システム。

【請求項６】電力制御部の制御とは無関係に電力を供給する予備電力供給部と、照明負荷に対して電力供給部のみの電力を供給するか電力供給部の電力に予備電力供給部の電力を加算した電力を供給するかを選択するスイッチ部とを付加したことを特徴とする請求項３記載の照明システム。

【請求項７】電力制御部の制御とは無関係に電力を供給する予備電力供給部と予備電力供給部に接続される定照度照明負荷とを付設して成ることを特徴とする請求項３記載の照明システム。

【請求項８】電力レベル設定部において、設定する電力レベル値を時刻によって変化させることを特徴とする請求項４、５記載の照明システム。

【請求項９】受光部と電力供給部とを同一の太陽電池で構成すること特徴とする請求項３記載の照明システム。

【請求項１０】受光部と電力供給部とを同一の太陽電池で構成し、予備電力供給部を商用電源と整流器とで構成することを特徴とする請求項５～７記載の照明システム。

【請求項１１】電力供給部若しくは太陽電池の出力に低周波通過フィルタを付加して平滑化した電力を照明負荷の点灯電力として供給することを特徴とする請求項３、７、８記載の照明システム。

【請求項１２】電力レベル設定部において、夜間は小さく昼間は大きな値とし、朝の移行期と夕方の移行期にはそれぞれ晴天時の日の出と日没をシミュレートするように電力設定値を時間変化させることを特徴とする請求項８記載の照明システム。

【請求項１３】受光部あるいは太陽電池において、日の出方角に受光面が向くように設置することを特徴とする請求項３、９、１０記載の照明システム。

【請求項１４】受光部あるいは太陽電池に、受光面可動部と太陽方位判定手段とを付加して、受光部あるいは太陽電池の受光面が太陽の方角を追従するように太陽方位判定手段の判定出力に基づいて受光面可動部を制御することを特徴とする請求項３、９、１０記載の照明システム。

【請求項１５】建物に設けた採光窓の方向に受光部あるいは太陽電池の受光面が向くように設置することを特徴とする請求項３、９、１０記載の照明システム。

【請求項１６】照明域の日没以後の照度が作業に適する照度となるように照明負荷の点灯を制御することを特徴とする請求項１又は２記載の照明システム。

【請求項１７】照明域の正午付近の照度が少なくとも休息に適する照度となるように照明負荷の点灯を制御することを特徴とする請求項１又は２記載の照明システム。

【請求項１８】照明域の照度の変化が連続的且つ徐々なる変化であることを特徴とする請求項１又は２記載の照明システム。

【請求項１９】高い照度として１０００～５００００ｌｘの範囲の照度を設定したことを特徴とする請求項１記載の照明システム。

【請求項２０】作業に適する照度として５００～９００ｌｘの範囲の照度を設定したことを特徴する請求項１６記載の照明システム。

【請求項２１】休息に適する照度として３００～６００ｌｘの範囲の照度を設定したことを特徴する請求項１７記載の照明システム。

【請求項２２】照明域の午前の平均照度を照明域の午後の平均照度よりも大としたことを特徴する請求項１又は２記載の照明システム。

【請求項２３】午前の照明域の照度の上昇速度を午後の照明域の照度の下降速度よりも大としたことを特徴とする請求項１、２、１８記載の照明システム。

【請求項２４】正午前後に設定される高い照度期間中に照度変化の揺らぎを持たせたことを特徴とする請求項１又は２記載の照明システム。

【請求項２５】照明域の照度が高いレベルから低いレベルへ下降する速度を低いレベルから高いレベルへ上昇する速度よりも小さくしたことを特徴とする請求項２１又は２４記載の照明システム。

【請求項２６】照明域の照度変化の周期にゆらぎを持たしたことを特徴とする請求項２４記載の照明システム。

【請求項２７】照明負荷は、基本照度を得るための基本照明負荷と、基本照度に重畳する形で特定の照明域の照度を変化させるためのタスク照明負荷と、タスク照明負荷の点灯制御の要、不要を設定する手段とを備え、少なくとも特定の照明域の照度が日の出から日没までの太陽光の光量の変化の推移するようにしたことを特徴とする請求項１又は２記載の照明システム。

【請求項２８】作業、業務に必要な最低限度の照度を確保する全般照明器具を設けるとともに、必要とする場所の照明を担う局部照明器具を点灯制御手段で制御される照明負荷として設けたことを特徴とする請求項１記載の照明システム。

【請求項２９】照明利用者の存否を検知する検知手段を付設し該検知手段により照明利用者の存在が検知されると照明利用者の視野内の照度を局部照明器具の照明で変化させることを特徴とする請求項２８記載の照明システム。

【請求項３０】局部照明器具として照射方向を照明利用者の位置に合わせて可変制御される照明器具を用いたことを特徴とする請求項２８又は２９記載の照明システム。

【請求項３１】送信手段から送信された照射方向情報を受信手段で受信して該照射方向情報に基づいて局部照明器具の照射方向を照明利用者の位置方向に変化させることを特徴とする請求項３０記載の照明システム。

【請求項３２】照明負荷が住宅用照明器具であることを特徴とする請求項１記載の照明システム。

【請求項３３】乗物内の照明を行う照明器具と、該照明器具の点灯を制御して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明器具で照明される照明域の照度を変化させる点灯制御手段とを備えたことを特徴とする照明システム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、乗物内や屋内の照明を外光と相関を持たせて制御する照明システムに関するものである。

【０００２】

【従来の技術】外光と相関を有する照明の状態を必要とする分野には以下の４つのものがある。第１の分野としては、生体リズム（体内時計）の調整ということがあげられる。人体には体内時計があり、その体内時計の固有周期は１日の２４時間に対して約１時間長いことが知られている。従って、例えば暗室または常時一定の照明下でかつ時刻の手掛かりのないところにおかれた人間は、体内時計の時刻の調整ができず、実際生活の時計の時刻と比較して日を追うごとに体内時計の時刻が後れていく。体内時計を１日の２４時間に合わせるためには、１日に約１時間時計を進める方向に調整しなければならない。このような体内時計の時刻の修正には、光（特に、明るい光）の刺激が有効であることが知られている。自然環境に従う通常生活においては、人間は主として太陽光の変化を刺激として体内時計の時刻の調整を行っているのである。

【０００３】ところで、生体リズム（体内時計）の調整がうまくいかない場合には、心身に様々な変調をきたすことが知られている。多くの人が経験するわかりやすい例として、体内時計の時刻と実際生活の時刻の相違による異常として、時差ぼけ症状をあげることができる。また、体内時計の調整に必要な光が不足することによって生体リズムに異常をきたし、季節性感情障害（冬季うつ病）が発症することがある。光の不足が加齢による生体リズム弱体化を促進して、老人の睡眠障害や痴呆症状の一部である昼夜逆転異常行動・夜間徘徊などにつながるという説もある。朝起きられない、あるいは登校できない子供達の中には、生体リズムに異常が見られる場合が多いという報告がある。

【０００４】このような生体リズム（体内時計）異常を解消あるいは予防するために、光（高照度光）を利用する方法が有効であることが知られており、人体に装着して眼球に光を照射する装置やパネル状に照明器具を配置して、顔面を照明する高照度光源を提供する装置などが開発されている。照度環境に関して低い照度でかつ恒常条件が想定される場所として、病院・老人ホーム・地下街などがあげられ、これらの場所では、生体リズム（体内時計）調整のための明るい光が必要であるとともに、同時に多数の人を対象に調光することが必要であると考えられる。さらに、それらの場所において生体リズム調整を目的として調光する場合に、外光（太陽光）と相関を有するような調光をすると、自然のリズムを取り戻す或いは維持するのに有効であると考えられる。

【０００５】第２番目の分野としては、昼間の明るい光による覚醒度の維持あるいは向上ということがあげられる。一般に、光刺激を網膜で受光することにより、眠気を誘発するといわれるメラトニンというホルモンの分泌が抑制されるということが知られている。また、光刺激により交感神経系の活動が亢進され、結果として覚醒度が向上することが知られている。このような光による覚醒維持効果は、照度が高くなるにつれて大きくなる傾向がある。なお、同じように明るい光刺激でも、一定の照度が長時間連続するよりも照度変化にゆらぎのある方が覚醒維持効果が高くなることが知られている。特に、照度下降時の変化速度を小さく照度上昇時の変化速度を大きくすると、より効果的である。

【０００６】さて、日中の覚醒度は夜間に比較すると高いレベルを維持するのが通常であるが日中においても時間とともに変化し、いくつかの山や谷を示すことが知られている。それらのうち日中の覚醒度低下が著しいのは、午後の前半（昼食後の時間帯に相当）であるが、昼食を取る取らないに関わらず覚醒度の変化が生じることが知られている。覚醒度の変化の度合いには個人差があるが、日中の覚醒度低下が大きい場合には、谷時間の時間帯に一度休息をとっておく方が、その後の作業効率が高まると考えられる。このような、光による覚醒維持作用の利用が想定される場所としてオフィス・工場・学校・地下街などが挙げられる。

【０００７】第３番目の分野としては、日照が取り入れられないあるいは不足がちの住環境に日照と同様の効果を与えるものとして、通称「ひまわり」という追従型の装置が知られている。この装置は、光ファイバーで太陽光を住環境まで導入しようとするものである。第４番目の分野としては、店舗やオフィス・工場などの窓際の照明に関する光の利用が知られている。店舗照明の場合一般に、外光が強くなると店舗内窓際の照明を明るくすることが効果的であると言われている。それは、外界と窓際の照度差が大きくなると店舗が暗く感じられるという悪影響が生じるためである。この悪影響を避けるために、外が明るいときには窓際の照明を多く点灯する事が行われている。また、オフィス・工場など通常人が在室する室内で側面が採光量の多い窓である場合、昼間特に晴天時には室内の人物や物体と背景の窓面との輝度コントラストが大きくて適切な見え方を維持することができない。このような悪影響を避けるために、外が明るいときには窓際の天井照明を室内中央の天井照明より明るくすることが効果的であると言われている。

【０００８】尚照度の測定位置は、顔面の照度が理想であるが正確な計測が困難であるため、通常代用特性として、床面から高さ１．２ｍ地点（椅子に座った時の眼球位置）での鉛直面照度を用いた。以下の説明に出てくる照度もこの位置での測定による。尚通常作業等に必要な基準としての照度は、机上面での水平面照度（作業等に必要な基準として）を言う。一般的には通常室内での両照度の関係は、水平面照度が鉛直面照度の約１．５倍となる。

【０００９】

【発明が解決しようとする課題】ところで上述した４つの分野について総じていえば、外光と相関を有するように自動的に調光制御される照明システムがないという問題点がある。つまり第１番目の分野において利用可能な既存の照明装置は、個人使用を目的とした小型のものであり、また、着脱やオン／オフの制御などが煩わしいという問題点がある。さらに、照度環境に関して低照度でかつ恒常条件が想定される病院・老人ホーム・地下街などの場所において生体リズム調整をしようという場合には、既存の小型の装置では、多くの台数が必要でかつ着脱やオン／オフの制御などに多くの人手を要し、実用的でないという問題点があった。

【００１０】また第２番目の分野において利用可能な既存の照明装置は、未だ実現されていなかった。また第３番目の分野における従来技術である「ひまわり」という装置は、設備が非常に大きく、その結果コストも大きくなるが、光ファイバーにより得られる光量は一般的室内照明に比べて少ないという問題点があった。

【００１１】第４番目の分野においては、手動によって窓際の照明の点灯数や種類を変えて調光しており、自動的で多段階に及ぶ調光ができないという問題点があった。さらに、室内照明としての実用性を持たせるために、必要最小量の電力を確保するという課題、外光と関係なく必要最小量の電力を確保するための電力源を別に用意しておくという課題、電力を設定レベルに常に制御したままでは外光と相関を有する電力を得られないので、電力が設定レベルに制御された状態か外光と相関を有する状態かの選択を必要に応じて切り換えることができるようにするという課題、外光と相関を有する電力の供給を受ける照明装置と外光と関係ない電力の供給を受ける照明装置とを分けて、室内の必要部分で外光と相関を有する照明を利用することができるようにする課題、例えば夜間就寝中は暗く昼間活動時には明るくするなど、室内照明に必要な明るさを時刻によって異なるレベルに設定することができるようにするという課題等々がある。

【００１２】このような照明システムにおいて実用性をさらに求めるならば、設備を小さくして合理的なシステムを提供し、太陽光を利用して商用電力に頼らなくてもすむようにすること、あるいは太陽光を利用して、商用電力消費を節約し妥当な量にすることと言う課題、外光と相関を有する電力が、例えば雲が太陽を横切るなどの外光の細かい変動にそのまま反応して変化してしまうと、室内照明の明るさが頻繁にかつ大きく変化して室内での生活に支障がでるだけでなく目にも悪影響が生じる恐れがあるので、そのような問題点がないように室内の明るさが小さい時定数では変化しないようにする課題がある。

【００１３】次に、各利用分野に特有の課題としては次のようなものがある。第１番目の生体リズム調整を目的とする利用分野では、昼間は明るく夜間は暗くというように昼夜で明るさのメリハリをつけるとともに、昼夜の切り換わりでは照度変化が急激にならないようにすると言う課題があり、外光と相関を有する照度変化の中で朝の光を特に重要視して利用するという課題がある。

【００１４】第２番目の明るい光による覚醒維持を目的とする利用分野では照度にゆらぎをもたせて、単に明るい光よりも一層覚醒維持効果を高めるという課題、照度変化速度について明→暗を暗→明より小さい速度にする

という課題、照度変化が規則的で単調にならないようにするという課題、照度制御を基本照明とタスク照明とに分けて、タスク照明により個人の状態に応じて適切な制御をするという課題がある。

【００１５】第３番目の日照不足がちの住環境への光補充を目的とする利用分野では、外光と相関を有する照明において、できるだけ光を多く室内に取り入れるという課題がある。第４番目の窓際照明での照度補正を目的とする利用分野では、外光と相関を有する照明を窓際に配置して室内照度補正を行うのであるが、窓から入射する外光と相関を持たせるようにするという課題がある。

【００１６】本発明は上述の課題を解決することを目的としてなされたものであり、太陽光の光量の推移と相関を持ち、生体リズム調整ができ且つ覚醒度の維持がし易い照明システムを提供することにある。加えて、室内照明としての実用性をもたせ、さらに、設備を小さく合理的システムにするとともに商用電力消費を減らすような照明システムを提供することを目的とする。

【００１７】さらに、外光と相関を有する照明により、より良く生体リズムを調整することができる照明システムを、また、オフィスなどで昼間の覚醒度を向上させ作業効率が上がるような光を制御できる照明システムを、また日照不足がちの住環境へも自然界のような光で照明することができる照明システムを、更にまた窓の外が明るいときに窓際照明の照度を大きくして室内での見え方に支障を生じない照明システムを提供することを目的とする。

【００１８】

【課題を解決するための手段】上記目的を達成するために請求項１の発明では、屋内の照明を行う照明負荷と、該照明負荷の点灯を制御して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明負荷で照明される照明域の照度を変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とする点灯制御手段とを備えたことを特徴とし、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とするので、生体リズム調整することができるとともに、日中の覚醒度低下を抑制して覚醒度を維持することができる。

【００１９】請求項２の発明では、請求項１の発明において、点灯制御手段は、既知の日の出から日没までの太陽光の光量の変化の推移に対応させて予め設定した点灯制御パターンに基づいて照明負荷の点灯を制御することを特徴とし、太陽光を受光して点灯制御を行わないため、点灯制御パターンを生体リズムに最適な形や使用状況に応じた形の点灯制御パターンを予め設定できる。

【００２０】請求項３の発明では、屋内の照明を行う照明負荷と、太陽光を受光してその光量と相関を有する信号を出力する受光部、受光部の出力信号と相関を有して照明負荷の点灯電力の大きさを設定する電力制御部、該電力制御部で設定される点灯電力で照明負荷を点灯する点灯装置、照明負荷に点灯装置を介して点灯電力を供給する電力供給部からなる点灯制御手段とを備えたことを特徴としたもので、太陽光と相関を有するような照度を得ることができ、生体リズム調整を自然のリズムを取り戻す形であるいはリズムや昼間の覚醒度を維持する形で行うのに有効となる。

【００２１】請求項４の発明では、請求項３の発明において、予め下限となる点灯電力レベルを設定した電力レベル設定部を備え、電力制御部は受光部の出力信号に対応した点灯電力と電力レベル設定部で設定した点灯電力とを比較して大きい方の点灯電力に対応するように照明負荷の点灯電力の大きさを制御することを特徴とし、、必要最小限の照度を確保することができて、室内照明としての実用性をもたせることができる。

【００２２】請求項５の発明では、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と予め下限となる電力レベルを設定した電力レベル設定部とを備え、電力制御部は電力供給部の供給電力が電力レベル設定部で設定したレベルの点灯電力より下回る場合予備電力供給部の電力を電力供給部の供給電力に加算して照明負荷に供給するように制御することを特徴とし、外光と関係なく必要最小限の照度を得るための点灯電力を確保するための電力源を別に用意しておくことにより、必要最小限の照度を得るための点灯電力を確保して室内照明としての実用性をもたせることができる。

【００２３】請求項６の発明では、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と、照明負荷に対して電力供給部のみの電力を供給するか電力供給部の電力に予備電力供給部の電力を加算した電力を供給するかを選択するスイッチ部とを付加したことを特徴とし、電力供給部の電力が少ない時には照明負荷の点灯電力を一定値にして必要最小限の照度を確保することができ、また電力供給部の電力が十分な時には予備電力供給部を切り離して、外光と相関を有する照度となるように照明負荷の点灯を制御することができる。

【００２４】請求項７の発明では、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と予備電力供給部に接続される定照度照明負荷とを付設して成ることを特徴とし、室内で外光と相関を有する照明を必要とする部分で選択的に利用することができるとともにその他の部分では常に一定の電力を確保して室内照明としての実用性をもたせることができる。

【００２５】請求項８の発明では、請求項４、５に発明において、電力レベル設定部で設定する電力レベル値を時刻によって変化させるので、夜間就寝中は暗く昼間活動時には明るくするなど、室内照明に必要な明るさを時

刻によって異なるレベルに設定することができる。請求項９の発明では、請求項３の発明において、受光部と電力供給部とを同一の太陽電池で構成すること特徴とし、設備を小さくして合理的なシステムを提供でき、外光と相関を有する照明システムにおいて実用性を更に高めることができる。

【００２６】請求項１０の発明では、請求項５～７記載の発明において、請求項５～７の発明において、受光部と電力供給部とを同一の太陽電池で構成し、予備電力供給部を商用電源と整流器とで構成したことを特徴とし、設備を小さくして合理的なシステムを提供できるだけでなく、太陽光を利用して商用電力消費を節約し妥当な量にすることができる。

【００２７】請求項１１の発明では、請求項３、７、８の発明において、電力供給部若しくは太陽電池の出力に低周波通過フィルタを付加して平滑化した電力を照明負荷の点灯電力として供給することを特徴とし、平滑化した電力を負荷である照明装置に供給でき、室内の明るさが小さい時定数では変化しないようになり、外光と相関を有する電力が、例えば雲が太陽を横切るなどの外光の細かい変動にそのまま反応して変化して室内照明の明るさが頻繁にかつ大きく変化して室内での生活に支障がでるだけでなく目にも悪影響が生じる等の恐れがない。

【００２８】請求項１２の発明では、請求項８の発明において、電力レベル設定部で、夜間は小さく昼間は大きな値とし、朝の移行期と夕方の移行期にはそれぞれ晴天時の日の出と日没をシミュレートするように電力設定値を時間変化させることを特徴とし、昼間は明るく夜間は暗くというように昼夜で明るさのメリハリをつけるとともに、昼夜の切り換わりでは照度変化が急激にならないようにして、生体リズム調整機能を向上させることができる。

【００２９】請求項１３の発明では、請求項３、９、１０の発明において、受光部あるいは太陽電池において、日の出方角に受光面が向くように設置することを特徴とする昼間は明るく夜間は暗くというように昼夜で明るさのメリハリをつけ昼夜の切り扱わりでは照度変化が急激にならないようにするとともに、外光と相関を有する照度変化の中で朝の光を特に重要視して利用することができ、生体リズム調整機能をさらに向上させることができる。

【００３０】請求項１４の発明では、請求項３、９、１０の発明において、受光部あるいは太陽電池に、受光面可動部と太陽方位判定手段とを付加して、受光部あるいは太陽電池の受光面が太陽の方角を追従するように太陽方位判定手段の判定出力に基づいて受光面可動部を制御することを特徴とし、受光面が太陽の方角を追従するように制御することができ、日照不足がちの住環境への光補充を目的とする場合に、できるだけ光を多く室内に取り入れることができる。

【００３１】請求項１５の発明では、請求項３、９、１０の発明において、建物に設けた採光窓の方向に受光部あるいは太陽電池の受光面が向くように設置することを特徴とし、窓から入射する外光と相関を有する照明を窓際に配置して窓際照明での照度補正の性能を向上させることができる。請求項１６の発明では、請求項１又は２の発明において、照明域の日没以後の照度が作業に適する照度となるように照明負荷の点灯を制御するので、実作業上問題とならず必要な照度を確保できる。

【００３２】請求項１７の発明では、請求項１又は２の発明において、照明域の正午付近の照度が少なくとも休息に適する照度となるように照明負荷の点灯を制御するので、午後の覚醒度低下の時期において一度休息が取れ、その後の作業効率をより向上させることができる。請求項１８の発明では、請求項１又は２の発明において、照明域の照度の変化が連続的且つ徐々なる変化であるので、自然光の変化に近づけて自然のリズムを取り戻すことやリズムや昼間の覚醒度を維持することがし易くなる。

【００３３】請求項１９の発明では、請求項１の発明において、高い照度として１０００～５０００ｌｘの範囲の照度を設定したことを特徴とし、生体リズム調整がより効果的となり、覚醒度の維持向上も図れる。請求項２０の発明では、請求項１６において、作業に適する照度として５００～９００ｌｘの範囲の照度を設定したので、作業効率の向上が図れる。

【００３４】請求項２１の発明では、請求項１７の発明において、休息に適する照度として３００～６００ｌｘの範囲の照度を設定したので、休息に有効となる。請求項２２の発明では、請求項１又は２の発明において、照明域の午前の平均照度を照明域の午後の平均照度よりも大としたことを特徴とし、覚醒維持がし易い。また、生体リズム調整にもより効果的である。

【００３５】請求項２３の発明では、請求項１、２、１８において、午前の照明域の照度の上昇速度を午後の照明域の照度の下降速度よりも大としたことを特徴とし、覚醒維持がし易い。また、生体リズム調整にもより効果的である。請求項２４の発明では、正午前後に設定される高い照度期間中に照度変化の揺らぎを持たせたことを特徴とし、覚醒維持がよりし易い。

【００３６】請求項２５の発明では、請求項２１又は２４の発明において、照明域の照度が高いレベルから低いレベルへ下降する速度を低いレベルから高いレベルへ上昇する速度よりも小さくしたことを特徴とし、覚醒度を向上させるのに有効となる。請求項２６の発明では、請求項２４の発明において、照明域の照度変化の周期にゆらぎを持たしたことを特徴とし、覚醒度を維持するのにより有効となる。

【００３７】請求項２７の発明では、請求項１又は２の発明において、照明負荷は、基本照度を得るための基本

照明負荷と、基本照度に重畳する形で特定の照明域の照度を変化させるためのタスク照明負荷と、タスク照明負荷の点灯制御の要、不要を設定する手段とを備え、少なくとも特定の照明域の照度が日の出から日没までの太陽光の光量変化のように推移するようにしたことを特徴とし、全体の照明による電力消費を抑えつつ、個人レベルでの生体リズムの調整が可能な点灯制御ができる。

【００３８】請求項２８の発明では、請求項１の発明において、作業、業務に必要な最低限度の照度を確保する全般照明器具を設けるとともに、必要とする場所の照明を担う局部照明器具を点灯制御手段で制御される照明負荷として設けたことを特徴とし、必要なところにのみ局部照明器具によって高照度で照射することができ、そのため少ない点灯エネルギーで照明利用者の個人レベルでの生体リズムの調整が可能な点灯制御ができる。

【００３９】請求項２９の発明では、請求項２８の発明において、照明利用者の存否を検知する検知手段を付設し該検知手段により照明利用者の存在が検知されると照明利用者の視野内の照度を局部照明器具の照明で変化させることを特徴とし、照明利用者が存在するときにのみ制御を行なうので、無駄が無くなる。請求項３０の発明では、請求項２８又は２９の発明において、局部照明器具として照射方向を照明利用者の位置に合わせて可変制御される照明器具を用いたことを特徴とし、局部照明器具の下にいなくとも、照明利用者の視野内に必要な照度を与えることができ、照射しなければならないと考えられる全ての場所を考慮して照明器具を設置する必要が無くなるので、局部照明器具の台数が少なく済む。

【００４０】請求項３１の発明では、請求項３０の発明において、送信手段から送信された照射方向情報を受信手段で受信して該照射方向情報に基づいて局部照明器具の照射方向を照明利用者の位置方向に変化させることを特徴とし、送信手段を照明利用者自身が操作して照射方向情報を送信させることにより所望する方向に局部照明器具の照射方向を設定できるため、照明利用者の存在位置方向に容易に照射方向を設定でき、照明利用者の視野内に必要な照度を与えることが可能となる。

【００４１】請求項３２の発明では、請求項１の発明において、照明負荷が住宅用照明器具であることを特徴とし、生活環境において、照明利用者の生体リズムの調整が可能な照明が得られる。請求項３３の発明では、乗物内の照明を行う照明器具と、該照明器具の点灯を制御して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明器具で照明される照明域の照度を変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とする点灯制御手段とを備えたことを特徴とし、時差や、到着時刻等に対応して、照明利用者の生体リズムの調整が可能な点灯制御ができる。

【００４２】

【発明の実施の形態】

（実施形態１）図１は本実施形態を示すもので、本実施形態は太陽光を受光して、その光量と相関を有する信号を出力する例えば太陽電池あるいはＣｄＳ等の受光素子からなる受光部１と、受光部１に接続され受光部１の出力信号と相関を有する点灯電力で照明負荷５を点灯させるための制御信号を出力する電力制御部２と、電力制御部２の制御信号に応じた点灯電力で照明負荷５を連続調光点灯させる点灯装置６と、該点灯装置４を通じて照明負荷５に電力を供給する電力供給部３とから構成される。

【００４３】照明負荷５は本実施形態（以下に述べる他の実施形態でも同様）では蛍光ランプのような放電灯負荷を用い、これに対応して点灯装置４には外部からの制御信号の幅に応じて発振周波数を可変して安定器用インピーダンスを変化させ、点灯電力（ランプ電流）を制御する連続調光機能を持つインバータ装置を用いる。尚白熱ランプやハロゲンランプが照明負荷の場合には外部からの制御信号の幅に応じて位相制御等により点灯電力を制御するような調光装置が用いられる。もちろんこのような方式以外の点灯装置であっても良い。また電力供給部３はインバータ装置である点灯装置４に直流電力を供給するものを用いる。

【００４４】次に本実施形態の動作について詳述する。受光部１は、太陽光の光量と相関（比例）を有する電圧信号を電力制御部２へ出力する。電力制御部２は基準波形発生部６で発生される所定周波数の三角波形の基準電圧信号と受光部１からの電圧信号とを比較する比較部７とからなり、比較部７は図２（ａ）に示す基準波形発生部６の基準電圧信号V_0が受光部１からの電圧信号V_1よりも高いときには”Ｈ”出力を図２（ｂ）に示すように出し、その反対のときには”Ｌ”出力を出す。つまり太陽光の受光光量が多くなると信号幅が小さい制御信号を、また逆に受光光量が少なくなると信号幅が大きい”Ｈ”の制御信号を生成して点灯装置４へ出力する。

【００４５】点灯装置４は入力する制御信号の幅に応じて、図３（ａ）に示す太陽からの受光光量（外光）の変化に比例して照明対象である室内の照度（例えば机上面の照度）が図３（ｂ）に示す如く変化するように照明負荷５へ供給する点灯電力を設定する。つまり点灯装置４は受光光量が少なくなって制御信号の幅が大きくなるとそれに応じて点灯電力を小さくして照明負荷５の光出力を小さくし、照明域の照度を低下させる。逆に受光光量が多くなって制御信号の幅が小さくなると点灯電力を大きくして照明負荷５の光出力を増加させ、照明域の照度を高くするのである。

【００４６】（実施形態２）図４は本実施形態を示すもので、本実施形態は図示するように太陽光を受光して、その光量と相関を有する信号を出力する受光部１と、受光部１に接続され受光部１の出力信号と相関を有する点

灯電力で照明負荷５を点灯させるための制御信号を出力する電力制御部２と、電力制御部２の制御信号に応じた点灯電力で照明負荷５を連続調光点灯する点灯装置４と、該点灯装置４を通じて照明負荷５に電力を供給する電力供給部３とを備えるとともに、照明負荷５の点灯電力の下限レベルを予め設定するための電力レベル設定部８より構成されている。尚本実施形態では受光部１、点灯装置４、照明負荷５及び電力供給部３は実施形態１と同じ構成のものが用いられる。

【００４７】次に本実施形態の動作について詳述する。受光部１は、実施形態１と同様に太陽光の光量と相関（比例）を有する電圧信号を発生する。電力制御部２は基準波形発生部６で発生される所定周波数の三角波形の基準電圧信号と受光部１からの電圧信号とを比較する比較部７とからなり、比較部７は基準波形発生部６の基準電圧V_0が受光部１からの電圧信号V_1よりも高いときには比較部７は”Ｈ”出力を出し、その反対のときには”Ｌ”出力を出す（図２（ａ）（ｂ）参照）。”Ｈ”出力により構成される制御信号は電力レベル設定部８から出力される設定信号とともにアンド回路９に入力して論理積がとられる。

【００４８】電力レベル設定部８は基準波形発生部１０と、下限となる電力レベルを設定する例えばボリューム１２及び基準電圧源１３からなる設定部１１と、比較部１４とからなり、基準波形発生部１０は電力制御部２の基準波形発生部６と同様に三角波形の基準電圧信号を出力し、比較部１４は基準電圧信号と設定部１１の出力電圧とを比較して基準波形発生部１０基準電圧信号が設定部１１の出力電圧を越えている場合に”Ｈ”の信号を出力する。尚基準波形発生部６、１０は同期し且つ同じ波形の基準電圧信号を出力するものとする。

【００４９】従って比較部７の出力信号の幅が、比較部１４の出力信号の幅より小さい場合には比較部７の出力信号が制御信号として点灯装置４へ出力され、比較部７の出力信号の幅が比較部１４の出力信号の幅より大きくなると比較部１４の出力信号が制御信号として点灯装置４へ出力される。つまり受光部１の受光光量が少なくなって、比較部７の出力信号の幅が比較部１４の出力信号の幅より大きくなると、制御信号の幅は比較部１４の出力信号の幅に固定される。従って点灯電力の下限レベルが比較部１４の出力信号の幅により設定されることになる。

【００５０】而して本実施形態の点灯装置４では入力する制御信号の幅に応じて図５（ａ）に示す太陽からの受光光量（外光）の変化に比例して照明対象である室内の照度（例えば机上面の照度）が図５（ｂ）に示す如く変化するように照明負荷５へ供給する点灯電力を設定する。つまり受光光量が少ない場合には点灯電力を小さくして照度を低下させ、逆に受光光量が多くなると点灯電力を大きくして照度を高くするのである。また受光部１の受光光量が一定以下になれば予め設定された下限レベルの照度に固定して必要最小限の照度を確保する。

【００５１】（実施形態３）図６は本実施形態を示しており、図示するように本実施形態では、点灯装置４を介して照明負荷５に点灯電力を供給する電力供給源として、逆流防止用ダイオードD_2を介して点灯装置４の電源入力端に出力端を接続した太陽電池からなる電力供給部３と、電流制限回路１６と逆流防止用ダイオードD_1とを介して点灯装置４の電源入力端に出力端を接続した商用電源と整流器からなる予備電力供給部１５とを用いている。

【００５２】また点灯装置４の電源入力端の電圧を入力するレベル調整器１７と基準波形発生部１８と比較部１９からなる電力レベル設定部２０を付設してある。点灯装置４は電力レベル設定部２０と電力制御部２からの制御信号を受けて照明負荷５の点灯電力を制御して照明負荷５を調光点灯させる。電力制御部２は実施形態１、２のものと同様に受光部１の出力を受けて太陽光の光量に相関した幅を持つ制御信号を出力するもので、内部構成については図６では省略している。

【００５３】電力レベル設定部２０の基準波形発生部１８は電力制御部２の基準波形発生部６と同様な三角波形の基準電圧を出力する。次に本実施形態の動作について詳述する。而してシステムの動作中にあっては、電力供給部３と予備電力供給部１５から点灯装置４へ電力供給が行われるが、点灯電力が増大した場合、予備電力供給部１５の負担も大きくなる。

【００５４】予備電力供給部１５は電力制御部２の補助的な役割のため、その電源容量が小さく、点灯装置４の点灯電力が増大して負担が大きくなった場合、出力電流が増大するが、電流制限回路１６によりその電流制限を受けることになる。そのため電力供給部３側の負担が増えることになるが、電力供給部３の供給可能な電力にも限界があるため、電力供給部３の供給可能な電力とと予備電力供給部１５の供給可能な電力とを併せた電力よりも点灯電力が大きい場合、過負荷状態となって負荷である点灯装置４の入力電圧は低下することになる。

【００５５】一方電力レベル設定部２０は点灯装置４の入力電圧をレベル調整器１７に入力してその電圧に対応した電圧レベルに相応する電圧を発生させ、この電圧と基準波形発生部１８が出力する基準電圧とを比較部１９で比較し、比較部１９から電力制御部２と同様な制御信号を出力するようになっており、上記のように点灯装置４の入力電圧が低下すると、それに伴って制御信号の幅が大きくなる。この電力レベル設定部２０の制御信号は電力制御部２からの制御信号とオア回路４８により論理和が取られて、点灯装置４に入力するようになっており、例えば受光部１の受光量が増大して電力制御部２から出力される制御信号の幅が小さくなっても、上記のように過負荷状態によって点灯装置４の入力電圧が低下し

た場合、電力レベル設定部２０の制御信号の幅が電力制御部２から出力される制御信号の幅より大きくなり、点灯装置４はこの制御信号を受けて点灯電力を小さくする方向に動作する。つまり電力供給部３と予備電力供給部１５とが現在供給できる最大の電力に応じた点灯電力で照明負荷５を点灯させるように点灯電力を制御することになる。

【００５６】（実施形態４）図７は本実施形態を示しており、本実施形態は図示するように太陽光を受光して、その光量と相関を有する信号を出力する受光部１と、受光部１に接続され受光部１の出力信号と相関を有する点灯電力で照明負荷５を点灯させるための制御信号を出力する電力制御部２と、電力制御部２の制御信号に応じた点灯電力で照明負荷５を点灯させる調光点灯装置のような点灯装置４と、該点灯装置４を通じて照明負荷５に電力を供給する電力供給部３とを備えるとともに予備電力供給部１５を備え、この予備電力供給部１５の出力を逆流阻止用ダイオードD_1とスイッチSW_1とを介して点灯装置４の電源入力端に、また電力供給部３の出力を逆流阻止用ダイオードD_2を介して点灯装置４の電源入力端に接続してある。

【００５７】ここで受光部１と、点灯装置４、照明負荷５及び電力供給部３の構成は実施形態１に準ずるものとし、また予備電力供給部１５の構成は実施形態３に準ずるものとしている。また電力制御部２は比較部７の出力端を２接点切換スイッチSW_2の一方の固定接点ａに接続してあり、切換スイッチSW_2の可動接点が固定接点ａに接続されると、比較部７の出力する制御信号が点灯装置４の信号入力端に入力され、切換スイッチSW_2の可動接点が固定接点ｂに接続されると、比較部７の出力する制御信号は点灯装置４に出力されず、点灯装置４の信号入力端はグランドに接続される。

【００５８】スイッチSW_1と切換スイッチSW_2とは連動するもので、スイッチSW_1がオン状態の場合切換スイッチSW_2の可動接点は固定接点ｂ側に接続され、スイッチSW_1がオフ状態の場合切換スイッチSW_2の可動接点は固定接点ａ側に接続される。次に本実施形態の動作について詳述する。

【００５９】まずスイッチSW_1がオフされると、電力制御部２の出力端は点灯装置４の信号入力端に接続される。この場合実施形態１と同様な回路構成となって、同様な動作が為される。この場合の動作説明は実施形態１と同じであるため説明は省略する。次いでスイッチSW_1がオンされると、連動して切換スイッチSW_2の可動接点が固定接点ｂ側に接続され、このため点灯装置４の信号入力端は”Ｌ”レベルとなる。つまり制御信号の幅が零となり、点灯装置４は照明負荷５を全点灯させる。この場合、電力供給部３と予備電力供給部１５とから供給されることになり、照明負荷５を全点灯させるのに十分な電力供給が為されることになる。

【００６０】つまり、本実施形態によれば、外光と相関を有する照明システムがスイッチSW_1をオフさせることにより実現でき、またスイッチSW_1をオンすることにより外光に無関係に全点灯のモードをユーザーが選択できるシステムを構成することができる。尚本実施形態の受光部１と電力供給部３としては太陽電池を用い、予備電力供給部１５としては商用電源と整流器からなる電源回路を用いれば良い。勿論この構成に限定されるものではない。

【００６１】（実施形態５）図８は本実施形態を示し、本実施形態は、実施形態１のシステムに付加する形でと、予備電力供給部１５と定照度点灯装置４７とこの定照度点灯装置４７で点灯される照明負荷５’とからなるシステムを設け、これら両システムで本発明の照明システムを構築したものである。

【００６２】次に、本実施形態の動作について詳述する。まず図８の中の実施形態１と同じ部分（枠Ｘ内）は同じ機能を果たすので説明を省略する。枠Ｙ内のシステムでは予備電力供給部１５からの電力によって、定照度点灯装置４７は照明負荷５’を照明域の照度が一定となるように点灯電力を供給して点灯させる。

【００６３】従って、本実施形態では、枠Ｙの照明負荷５’の点灯よる一定照度をベースに枠Ｘのシステムによって得られる太陽光の光量に相関する照度が重畳することになる。また、枠Ｘ内のシステムで点灯装置４で点灯される照明負荷５と、枠Ｙ内の定照度点灯装置４７で点灯される照明負荷５’の配置を分けることができ、例えば窓際に照明負荷５を、天井全面に照明負荷５’を配置すれば、窓際で太陽光の光量に相関する照度が重畳されて室内照度補正ができる。

【００６４】尚本実施形態の受光部１と電力供給部３としては太陽電池を用い、予備電力供給部１５としては商用電源と整流器からなる電源回路を用いると良い。勿論この構成に限定されるものではない。

（実施形態６）図９は本実施形態を示し、本実施形態は実施形態２と同様に太陽光を受光して、その光量と相関を有する信号を出力する受光部１と、受光部１に接続され受光部１の出力信号と相関を有する点灯電力で照明負荷５を点灯させるための制御信号を出力する電力制御部２と、電力制御部２の制御信号に応じた点灯電力で照明負荷５を点灯させる調光点灯装置のような点灯装置４と、該点灯装置４を通じて照明負荷５に電力を供給する電力供給部３とを備えるとともに、照明負荷５の点灯電力の下限レベルを予め設定するための電力レベル設定部８より構成されているが、本実施形態の電力レベル部６の設定部９は、タイマー２２と、ＲＯＭ２３、Ｄ／Ａ変換部２４とで構成されている点で実施形態２の場合と異なる。

【００６５】設定部６のＲＯＭ２３は例えば一日の予め設定された電力レベルのデータを書き込まれ、タイマー

２２は時刻の経過とともに時刻に応じてＲＯＭ２３の読み出しアドレスデータを出力する。つまり時刻の経過に応じた電力レベルのデータが刻々ＲＯＭ２３から読み出されて、ＲＯＭ２３の出力端に接続されたＤ／Ａ変換部２４によりアナログの電圧信号に変換されて比較部１４に入力される。

【００６６】次に本実施形態の動作について詳述する。まずタイマー２２は現在の時刻をＲＯＭ２３のアドレスデータの形で出力し、ＲＯＭ２３は指定されたアドレスに格納されている電力レベルデータを出力する。Ｄ／Ａ変換部２４は電力レベルデータをアナログの電圧信号として出力し、この出力された電圧信号は比較部１４により基準電圧波形発生１０の基準電圧信号とが比較され、比較部１４はＤ／Ａ変換部２４からの電圧信号を基準電圧信号が越えた期間に対応する幅の信号を出力する。この信号の幅が電力制御部２の比較部７より出力される制御信号の幅より大きい間は比較部７の制御信号がアンド回路９を介して点灯装置４に与えられ、比較部１４の信号の幅が電力制御部２の比較部７より出力される制御信号の幅より小さくなると比較部１４の信号がアンド回路９を介して点灯装置４に制御信号として与えられることになる。

【００６７】つまり本実施形態では時刻に応じて照度の下限レベルがＲＯＭ２３に予め書き込んである電力レベルによって設定でき、太陽光の受光光量が少ない曇りや雨の日の昼間ではＲＯＭ２３からの電力レベルデータに基づいて照明負荷５の点灯電力を制御して所定の照度を確保することができる。尚ＲＯＭ２３に書き込む電力レベルのデータとして、夜間は小さく昼間は大きな値とし、また朝の移行期と夕方の移行期にはそれぞれ晴天時の日の出と日没をシミュレートするような値とすると、好ましい照度パターンが得られる。特に望ましいパターンとしては、午前中に明るさが最大となるものがよく、１０００乃至５００００１ｘの範囲の室内照度が得られれば都合がよい。

【００６８】また、緯度が高いと日の出時刻の季節差が大きくなるが、冬に極端に日の出が遅くなると生体リズム調整にとって好ましくないと考えられる。このような場合には、春や秋の標準的な照度変化パターンを設定しておけば、日の出時刻の季節差を補正して生体リズム調整にとって好ましい照度パターンを得ることができる。

【００６９】図１０はＲＯＭ２３に書き込まれたの電力データの一例を時系列的にグラフ化したものである。別の例（図省略）として、午前の前半の設定値を特に高く（１０００～５００００１ｘ）してその後の昼間の設定値は通常の室内の明るさ（例えば５００１ｘ程度）に、設定しておくこともできる。

【００７０】本実施形態６に用いた一日の予め設定された電力レベルのデータを書き込んだＲＯＭとＲＯＭのアドレスを時刻データとして出力するタイマー２２とＲＯＭ２３から出力される電力レベルのデータをＤ／Ａ変換するＤ／Ａ変換部２４の構成を、実施形態３における電流制限回路１６に付加し、電流制限回路１６の閾値をＤ／Ａ変換部２４の出力で制御するようにすれば、下限あるいは設定する電力レベルを時刻によって変化させる照明システムを実現することができる。

【００７１】（実施形態７）図１１は本発明の実施形態を示しており、図示するように本実施形態は電力供給部を、太陽光を受光する太陽電池からなる受光部１’で兼用したもので、電力制御部２、点灯装置４、照明負荷５の構成は実施形態１と同じ構成となっているである。

【００７２】次に、本実施形態の動作について詳述する。太陽電池からなる受光部１’の出力電力が点灯装置４が照明負荷５に供給する点灯電力よりも小さいときには太陽電池からなる受光部１’の出力電圧は低下する。電力制御部２は受光部１’の受光光量に応じて出力電圧と基準電圧波形発生部１５の基準電圧とを比較して受光部１’を構成する太陽電池の出力電力に相応した幅を持つ制御信号を点灯装置４に出力する。

【００７３】その結果点灯装置４により制御される照明負荷５に点灯電力は電力供給部を兼ねた受光部１’の太陽電池の出力電圧が低下する受光光量の少ないときには小さくなり、逆に受光部１’の出力電圧が上昇する受光光量の多いときには大きくなって太陽光の受光光量と相関を有する照明システムを実現することができる。

（実施形態８）図１２は本実施形態を示しており、図示するように本実施形態は実施形態７の電力供給部を兼ねた受光部１’の出力に低周波通過フィルター（例えば、インタクタとコンデンサ等よりなるフィルター）２１を設けたもので、電力制御部２、点灯装置４、照明負荷５は実施例７と同じ構成となっている。

【００７４】而して本実施形態では、低周波通過フィルター２１を太陽電池からなる受光部１’の出力段に設けることにより、雲が太陽をさえぎる等に起因する急速な太陽電池の出力電圧の変動を平滑して電力制御部２及び点灯装置４に伝わらないようにすることができる。つまり本実施形態によれば、外光と相関を有する照明システムで、しかも一過性の受光光量の変化に対して応答性の遅くして対処した照明システムを実現することができる。

【００７５】尚その他の構成の動作は実施形態７と同じであるから、説明は省略する。ところで、上記実施形態１～６における受光部１の受光面、あるいは、実施形態７、８における太陽電池からなる受光部１’の受光面の方向については各実施形態の説明では特に言及していないが、受光面は日の出方角に向くように設置すればよい。単純な例では、東方向に受光面を設定すればよい。また、季節により日の出方位の差が顕著である場合には、カレンダーにより予想される日の出方位に合うように受光面の向きを制御すればよい。

【００７６】このようにして得られる室内照度を時系列的にグラフ化した例を図１３に示す。望ましくは、室内照度最大値が１０００～５０００ｌｘとなるようであれば、生体リズム調整にとって都合がよい。尚図１３の縦軸は全点灯時の点灯電力を１００％とした場合の点灯電力の比率を示す。次の実施形態９は上記受光部１の受光面を太陽に追従を自動的に行うための手段を設けたものである。

【００７７】（実施形態９）図１４は本実施形態を示すもので、本実施形態は基本的には実施形態１と同じ構成を基本構成とし、この基本構成に受光部１の受光面が太陽の方角に向くように受光部１を可動するためのモータ及びモータの回転を制御する制御部からなる受光面可動部２５と、受光面可動部２５に制御信号を与える太陽方位判定部２６とを加えたものである。

【００７８】次に本実施形態の動作について詳述する。まず受光部１の出力電圧は太陽方位判定部２６内の差動増幅部２７の非反転入力端に入力するとともに、サンプルホールド回路２８に入力する。サンプルホールド回路２８は受光部１の出力電圧をホールドするものであって、その出力は差動増幅部２７の反転入力端に入力している。差動増幅部２７の出力は現在の受光部１の出力電圧と、前にサンプルホールドした受光部１の出力電圧差を出力するようになっており受光面可動部２５はこの出力電圧差が最大となる位置までモータを駆動する。つまり受光部１の受光面が太陽に正対する位置まで受光部１の受光面を太陽の方角に追従させることができるのである。

【００７９】尚太陽追従以外の構成の動作は実施形態１と同じであるから、説明は省略する。また受光部１の可動機構としては公知の手段を用いればよいので、ここでは構造についての図示及び説明は省略する。

（実施形態１０）図１５は本実施形態を示しおり、本実施形態は、図示するように受光部１を屋内に設け、その受光面を建物２９に設けた採光窓３０方向に向けた点に特徴がある。つまり受光部１の受光面が採光窓３０とは異なる方向を向いていると、採光窓３０近辺の照度とは相関を有しなくなるので、本実施形態のように受光部１の受光面を採光窓３０の方向に向けることにより、採光窓３０の近辺の照度と相関を有する照明システムが実現できる。

【００８０】尚その他の構成は実施形態１と同じであり、またその動作も実施形態１と同じであるから、説明は省略する。

（実施形態１１）図１６は本実施形態を示しており、本実施形態は図示するように、電力供給部３と、点灯装置４と、照明負荷５と、電力制御部３１とで構成されるもので、電力制御部３１に特徴を有する。尚電力供給部３と、点灯装置４と、照明負荷５とは実施形態１と同じ構成である。

【００８１】つまり電力制御部３１には現在の日付を計時するカレンダータイマー３２と、現在時刻を計時するタイマー３３と、調光データ時系列データベース３４と、カレンダータイマー３２及びタイマー３３からの現在の日時データを取り込み、その日時データに対応する外光データを調光データ時系列データベース３４から読み出し、この外光データより相関を持たした照度が得られるように点灯装置４に与える調光データを作成する調光データ演算部３５と、調光データ演算部３５から与えられた制御データに対応する幅の制御信号を点灯装置４に出力する調光データ出力部３６とから構成される。

【００８２】ここで調光データ時系列データベース３４としては何月何日何時何分に外光（太陽光）がどのような明るさとなるかを既知の測定データ等に基づいて記述したデータテーブルか、或いは一日毎の日の出及び日没時刻の外光データと予め日の出から日没までの平均的な外光の明るさ変化のパターンデータとを記述したデータテーブルからなり、調光データ演算部３５は前者の場合にはそのまま読み出したデータを使用し、後者の場合には両データを読み出して両データに基づいた演算（乗算）を行うことにより現在時刻の外光データを求める。

【００８３】而して、本実施形態では、電力制御部３１が調光データ時系列データベース３４から得られる現在時刻の外光データに基づいて、その時点の調光のための制御信号を生成して点灯装置４へ与えるのである。この場合、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるような点灯制御パターンが得られるように制御データを調光データ演算部３５は作成する。

【００８４】ここで点灯制御パターンについては種々考えられるが、本実施形態では次のような点灯制御パータンを目的に応じて採用する。つまり点灯制御パターンとしては、図１７（ａ）に示すように日の出から正午にかけて直線的に照度を上昇させ、正午から日没まで照度を直線的に低下させる自然光変化に応じた基本的なパターン、更に図１７（ｂ）に示すように正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い一定照度とし、昼間の明るい光による覚醒度の維持、向上を狙ったパターン、また図１７（ｃ）に示すように図１７（ｂ）のパターンを基に日没後一定の照度として、日没後の実際の作業に支障を来さないようにするパターン、また更に図１７（ｄ）に示すように図１７（ｃ）のパータンを基に正午過ぎの覚醒度の低下が起きる時期に照度を低くした休憩期間を設定し、その後の作業効率をより向上させるパターン、図１７（ｅ）に示すように図１７（ｃ）のパターンを基に直線的な変化を対数的な変化に変え、より自然光変化に近づけたパターンがある。

【００８５】更に図１８（ａ）に示すように正午付近から日没前の所定の時刻まで照度を一定速度で下降させその後所定の照度を保つようにし、午前の光が生体リズム

の調整と昼間の覚醒維持に有効となるようにしたパターン、また図１８（ｂ）に示すように図１８（ａ）のパターンを基に午前の照度上昇速度を大に、午後の照度の下降速度を小とし、図１８（ａ）の効果を狙うとともに、覚醒維持をし易くしたパターン、更にまた図１８（ｃ）に示すように図１８（ｂ）のパターンの一定照度期間に照度の揺らぎを持たせて覚醒維持をよりし易くしたパターン、また図１８（ｄ）に示すように図１８（ｃ）の揺らぎの部分において下降速度を緩やかに上昇速度を急にして、覚醒度の向上をより有効にするパターンがある。この場合揺らぎ部分は図１８（ｅ）に示すように周期的によりランダムにした方が順応が少なく覚醒度維持により有効となる。

【００８６】また作業場の照明の場合、始業時刻を始点とした図１９（ａ）乃至図１９（ｄ）に示すパターンがある。この場合図１９（ａ）は午前中を高い照度で一定に維持し、、午後を外光に比例して照度を変化させたパターン、図１９（ｂ）は一定照度時間に幅を持たせ、かつ休息期間を設定したパターン、図１９（ｃ）（ｄ）は図１７（ａ）と図１８（ａ）のパターンをモデルにしたターンである。

【００８７】而して本実施形態によれば、太陽光を実際に受光することなく、任意の点灯制御パターンを設定することが可能となり、照明する場所に適したパターンや、生体リズムを考慮したパターンを実現することができる。尚夏と冬とでは日照時間帯が異なるような場合、必ずしも忠実に自然光の変化を再現するのが良いとは限らない。そこで例えば電力制御部３１のカレンダータイマー３３の出力幅を１／２として春分及び秋分を中心にして夏至或いは冬至までの日付変化を１／２とするようにしても良い。

【００８８】或いは調光データ時系列データベース３４の日の出、日没時刻のデータを２日単位で出すようにしても良い。更に照明利用者の好きな季節を設定してその季節に応じた照度変化をに対応する点灯制御パターンを出力するようにしても良い。

（実施形態１２）図２０は本実施形態を示すもので、本実施形態は図示するように実施形態１１で用いた電力制御部３１の制御信号により点灯装置４を通じて天井等に取り付けた基本照明負荷５ａの点灯電力を制御する構成に加えて、個人用デスクスタンドや個人用スポットライト、ダウンライド等のタスク照明負荷５ｂの点灯電力を電力制御部３９の制御信号により点灯装置４０を通じて制御する構成となっている。ここで点灯装置４０は点灯装置４と同じ構成のもので、電力制御部３９から出力される制御信号の幅に応じて照明負荷５ｂの点灯電力を制御してタスク照明負荷５ｂの照明域の照度を可変することができるもので、点灯電力は電力供給部３からオン／オフ制御部３８を介して供給されるようになっている。オン／オフ制御部３８はタスク照明オン／オフ手動選択部３７の選択信号或いは、机等の着席状況を検出する着席状況検出部４１の検出出力に基づいてタスク照明のオン／オフの要、不要を判別する判別部４２の判別信号によりオン／オフし、オン時に電力供給部３からの電力を点灯装置４０に供給し、オフ時に遮断するようになっている。スイッチSW_0はオン／オフ制御部３８に接続する信号を、タスク照明オン／オフ手動選択部３７の選択信号と判別部４２の判別信号とから切換選択するためのスイッチである。

【００８９】電力制御部３９は、実施例１４の電力制御部３１における調光データ演算部と調光データ出力部を一体とした調光データ演算出力部４６と、覚醒度維持の点灯制御パターンを格納しているデータベース４５と、タスク照明を使用する個人情報や、個人用パターン選択のための入力部４３と、現在時刻を計時するタイマー４４とからなり、調光データ演算出力部４６はタイマー４４からの現在時刻データに基づいて対応する調光データをデータベース４５により読み出し、このデータを、個人情報や個人用パターン選択の内容に基づいて所定の調光レベルの制御信号を生成して出力する。

【００９０】尚本実施形態の電力制御部３１は実施例１１の電力制御部３１と同じものであるため、構成及び動作についての説明は省略する。而して本実施形態の場合室内全体の基本照明負荷５ａの照度制御は実施形態１１と同様に電力制御部３１からの制御信号により行う一方、着席具合や、あるいは必要に応じて個人用のタスク照明負荷５ｂの照度制御を覚醒度の維持を持たせことができるような点灯制御パターンで電力制御部３９より出力される制御信号に行うことができるのである。

【００９１】尚本実施形態では図２１（ａ）に示すように基本照明負荷５ａによる照明で、日の出から日没まで一定照度を保ち、日没から更に低い照度で一定に保つ基本照度を得、タスク照明負荷５ｂの点灯電力の制御を図２１（ｂ）に示すように外光（太陽光）の変化に相関した照度が得られるようにすることにより、外光と相関を持つ照度変化を持つ照明を行うことができる。この場合外光の変化に相関した照度変化を持たせた照明を個人毎に行うことができる上に、基本照明負荷５ａによる照度を低くすることができるため消費電力を少なくすることができる。

【００９２】また図２１（ｃ）に示すように基本照明負荷５ａによる照明で、日の出から日没まで図１７（ｄ）のパターンとなるように照度変化を得、タスク照明負荷５ｂの点灯電力の制御を図２１（ｄ）に示すように揺らぎを持たせるような制御も本実施形態では可能となる。基本照明負荷の照度変化が図２１（ｂ）（図１７（ｂ）に相当）でタスク照明負荷の制御が図２１（ｄ）という制御も可能であり、基本照明で１日の照度変化を大まかに再現し、タスク照明で覚醒維持パターンを重畳させることができる。

【００９３】尚上記実施形態１乃至１２で示す照明負荷は複数のランプであっても、１本１本のランプであっても良く、複数の場合には点灯装置として多灯点灯装置が用いられる。また複数の点灯装置を併設する場合には、電力制御部や電力出力部を共用しても良い。

（実施形態１３）本実施形態は、照明利用者たる作業者の作業場所が固定されている所、例えば執務室（オフィス）、工場の固定されている作業場、監視する対象の方向・監視場所が固定されている監視室等に適した照明システムにかかる。

【００９４】図２２は、本実施形態の構成を示しており、本実施形態の照明システムは、必要最小限の照度を確保するために設置された基本照明負荷となる光源を備えた全般照明器具４９及び全般照明器具４９用の点灯装置５２と、照明利用者Mに必要とする照度を与えるために、必要に応じて１個以上設置され照明利用者Mの視野内を照射するタスク照明負荷たる光源を備えたダウンライトやスポットライト等のような局部照明器具５０ａ…と、各局部照明器具５０ａ…に対応する調光機能を備えた点灯装置５１ａ…と、各局部照明器具５０ａ…を後述する光量変化となるように調光制御する制御データを各点灯装置５１ａ…に与える制御部５４と、制御部５４で制御データを作成するための光量変化情報を発生する光量変化情報発生部５６と、電源たる電力供給部５５とからなり、各照明器具４９及び５０ａ…を含めて天井部５３に配置してある。

【００９５】図２３は本実施形態の回路構成を示しており、光量変化情報発生部５６は、タイマーやカレンダータイマの計時時刻に基づいて実施形態１１と同様に調光データ時系列データベースより調光データを呼出して光量変化情報を発生したり、或いは外光の明るさを検知するセンサーの検知情報に基づいて光量変化情報を発生する機能を備えたもので、太陽光の光量の変化の推移と対応する光量変化情報を制御部５４へ与えるもので、制御部５４はこの光量変化情報発生部５６からの光量変化情報に基づいた調光データを制御データとして作成し、点灯装置５１ａ…に与えるようになっている。この場合作成される調光データは日の出から日没までの太陽光の光量の変化の推移と対応するように局部照明器具５０ａ…によって照射される照明域の照度を変化させ且つ、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるように局部照明器具５０ａ…局部照明用光源Ｌａ…を制御するように設定される。

【００９６】また制御部５４は電源たる電力供給部５５からの電力を各点灯装置５１ａ…を介して各局部照明器具５０ａ…に供給するようにもなっている。尚全般照明器具４９に対応する電源は別の電力供給部（図示せず）から与えるようになっている。勿論上記の電力供給部５５を共用してもよい。点灯装置５１ａ…は制御部５４からの制御データに基づいて局部照明器具５０ａ…の光源Ｌａ…への点灯電力の制御を行なって調光するとともに、夫々に設けてある局部照明用スイッチＳＷａ…の操作により点灯／消灯を行なうようになっている。

【００９７】而して本実施形態では、作業者たる照明利用者Mが作業を行う机５７等を，最も低照度で照明しなければいけない時には、全般照明器具４９のみで照明し、それより高い照度を照明利用者Mが必要とする時には、対応する各局部照明器具５０ａ…に設けた局部照明用スイッチＳＷａ…をオンすることで，ダウンライトやスポットライト等の局部照明器具５０ａ…による照明を全般照明器具４９の照明に加え、当該局部照明器具５０ａ…による照度を制御部５４によって制御することで、局部照明器具５０ａ…による照明域（照明利用者Mの視野内）の照度を必要とする照度に設定することができる。ここでこの照度を、日の出から日没までの太陽光の光量の変化の推移と対応するように変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるように変化させることで、上記の各実施形態と同様に照明利用者Mの生体リズムにあった照明が行なえることになる。　尚図２２の構成では局部照明器具５０ａ…を天井部５３に配設しているが、図２４に示すような相対する机５７，５７を仕切るパーティション５９に設置しても良い。但し、この場合局部照明器具５０ａ…は光拡散型のパネル５８を光源Ｌａ…の前面に取り付ける等して、直視して不快なまぶしさにならないようにしてある。図２４の例における回路構成及び全般照明器具４９の役割は上述と同様であるため、図２２、図２３の構成要素と同じ役割を持つ構成要素にには同じ番号、記号を付し、説明は省略する。尚電源たる電力供給部５５は全般照明用の点灯装置５２及び局部照明用の点灯装置５１ａ，５１ｂに夫々対応して設けてある。

【００９８】更にまた上記の局部照明器具５０ａ…は天井部５３やパーテション５９に配置する構成であったが、図２５乃至図２７に示すように机５７上に載置するスタンド型の器具で局部照明器具５０を構成しても良い。この場合も照明利用者Mの視野内の明るさ（照度）を上述のように日の出から日没までの太陽光の光量の変化の推移と対応するように変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とするように調光制御を局部照明器具５０に対して行なうのは勿論で、回路構成的には図２２（図２３）、図２４の例と同じである。

【００９９】但しこの場合透過拡散型のパネル５８’を図２６に示すように光源Ｌの前面に取り付ける等して、直視しても不快なまぶしさにならないようにしてある。尚図２６中６０は器具の筐体、６１は反射板である。また局部照明器具５０として図２８（ａ）乃至（ｃ）及び図２９（ｄ）に示すように通常のスタンドにも使用でき

るように機能切換の構成を持つ照明器具を用いても良い。

【０１００】図示する照明器具は、前面開口部に拡散型のパネル５８を被着し、内部に反射板１００と光源Ｌとを内蔵した箱状のスタンド部筐体１０１の前下端両側を支持台１０２の上前端両側に設けた枢軸１０９により前倒自在に枢支した構造となっており、スタンド部筐体１０１及び支持台１０２は上述したパーティション５９に形成せる前面と上面が開口した収納凹部１０３に収納してある。ここでスタンド部筐体１０１の両側側面の後部の上下位置に形成したガイド用突起１０４と、両突起１０４と同一線上の支持台１０２の両側側面に設けたガイド用突起１０５とを収納凹部１０３の両側内壁面の後部に設けた上下方向のガイド凹部１０６内に上下移動自在に嵌め、また支持台１０２の両側側面の前部に設けたガイド用突起１０７をガイド凹部１０６に並行するように収納凹部１０３の両側内壁面の前部に設けたガイド凹部１０８に上下動作自在に嵌め込んである。

【０１０１】而して本発明照明システムにおける局部照明器具５０として照明器具を使用する場合には、図２９（ａ）に示すようにガイド凹部１０６及び１０８の下端位置に支持台１０２の両側側面のガイド用突起１０４、１０７及び１０８があって、収納凹部１０３内にスタンド部筐体１０１が収納され支持台１０２上にスタンド部筐体１０１が載承された状態にセットする。この場合光源Ｌからでる光はパネル５８を介してパーティション５９の前方を照射する。

【０１０２】次に通常のスタンド照明として使用する場合には、図２９（ａ）に示す状態からスタンド部筐体１０１を、ガイド凹部１０６の上端開口よりガイド突起１０４、１０４が上方に抜け出てガイド用突起１０７がガイド凹部１０８の上端に衝突する位置（図２９（ｂ））まで移動させる。この状態からスンタンド筐体１０１を枢軸１０９を中心として図において反時計方向に回転させて図２９（ｃ）に示すようにスンタンド筐体１０１を前倒し状態とする。ここで図２９（ｃ）において後端下面部となるスタンド部筐体１０１の下端前面部が、上記支持台１０２の上面と同一面となる上面を持ち収納凹部１０３の前面開口より前方に突出させている支持台１１０上に載承されて支持されることになる。

【０１０３】この状態でスタンド部筐体１０１を支持台１０２のガイド用突起１０５，１０７がガイド凹部１０６，１０８の下端位置まで下方向に移動させれば照明方向が下向き（机上面方向）となるスタンドを構成することになる。

（実施形態１４）本実施形態は、実施形態１３の図２２のシステム構成において、図３０に示すように照明利用者Ｍの存在を認識できる熱線センサー等からなる人感センサー部６２ａ…を付加したシステムであり、多数の照明利用者Ｍが部屋に存在し、かつ照明利用者Ｍの作業場所が固定されていて、その場所を照明利用者Ｍが使わないことが頻繁にあり、照明利用者Ｍによって使用する時としない時のタイミングが異なる作業場、執務室（オフィス）等に適するようにしたものである。

【０１０４】図３１は本実施形態の回路構成を示しており、局部照明器具５０ａ…が照射しようとしている視野内の近くに照明利用者Ｍがいることを熱線センサー等からなる人感センサー部６２ａ…が検知し、その検知信号を対応する局部照明器具５０ａ…の点灯装置５１ａ…（或いは制御部５４）に送られ，その信号を受けた点灯装置５１ａ…（或いは制御部５４）が対応する局部照明器具５０ａ…に対して調光制御動作を行なう。つまり点灯装置５１ａ…に検知信号が送られる場合には、制御部５４からの制御データを有効として該制御データにより当該点灯装置５１ａ…が調光制御を行なう。また制御部５４に検知信号が送られる場合には制御部５４は対応する点灯装置５１ａ…に制御データを送り、この制御データを受け取った当該点灯装置５１ａ…は対応する局部照明器具５０ａ…に対して調光制御を行なう。

【０１０５】尚図３０、図３１に示す構成要素において図２２、図２３に基本的に同じ構成、同じ動作を為す構成要素には同じ番号、記号を付し、説明は省略する。また全般照明器具４９と点灯装置５２に対応する電源たる電力供給部は特には図示せず、省略してある。而して本実施形態の調光制御も実施形態１３と同様に照明利用者Ｍの視野内の明るさ（照度）を上述のように日の出から日没までの太陽光の光量の変化の推移と対応するように変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるように調光制御して、照明利用者Ｍの生体リズムにあった照明を行なう。

【０１０６】また本実施形態によれば作業をしている照明利用者Ｍの視野内のみ局部照明器具５０ａ…による照明を行なうことができる。

（実施形態１５）本実施形態は、図３２、図３３に示すように照明利用者Ｍの存在を認識できる人感センサー部６２ａ…を各局部照明器具５０ａ…毎に付加するとともに、人感センサー部６２ａ…の検知信号に基づいて照射方向可変自在な局部照明器具５０ａ…を設けたシステムで、照明利用者Ｍの作業場所が固定されない作業，執務室に最適で、会議室，机の配置等が頻繁に変わる執務室（オフィス）等に適しているものである。尚図３２では一つの局部照明器具５０ａしか示していないが、上記の実施形態１３、１４と同様に設置場所に応じて複数設けられる。

【０１０７】本実施形態で使用する人感センサー部６２ａ…は照明利用者Ｍの存在と位置を認識できるＣＣＤを用いた画像処理センサー等からなり、また局部照明器具５０ａ…は図３３に示すように局部照明用照射方向可変モーターＭＴ１、ＭＴ２を備えて該モーターＭＴ１、Ｍ

Ｔ２により駆動され、後述のように照射方向を自由に可変することができる照明器具からなる。

【０１０８】局部照明用照射方向可変モーターＭＴ１、ＭＴ２は夫々に対応して設けた局部照明用照射方向制御部６３ａ…により制御され、局部照明用照射方向制御部６３ａ…は対応する人感センサー部６２ａ…の照明利用者Ｍの位置検知情報に基づいて対応する局部照明器具５０ａ…の照射方向が、照明利用者Ｍの視野内となるように局部照明用照射方向可変モーターＭＴ１、ＭＴ２の回転を制御する。

【０１０９】尚その他の構成は実施形態１３と基本的には同じであるため、図２２、図２３で示す構成要素と同じ構成要素には同じ番号、記号を付して説明は省略する。而して本実施形態では、照明利用者Ｍを検知した人感センサー部、例えば６２ａはその検知信号を対応する局部照明器具５０ａの点灯装置５１ａ（或いは制御部５４）に送り、その検知信号を受けた点灯装置５１ａ（或いは制御部５４）は対応する局部照明器具５０ａに対して調光制御動作を行なう。つまり点灯装置５１ａに検知信号が送られる場合には、制御部５４からの調光の制御データを有効として該制御データにより当該点灯装置が調光制御を行なう。また制御部５４に検知信号が送られる場合には制御部５４は対応する点灯装置５１ａに制御データを送り、この制御データを受け取った当該点灯装置５１ａは対応する局部照明器具５０ａに対して調光制御を行なう。

【０１１０】上記の調光制御と同時に、人感センサー部６２ａは照明利用者Ｍの検知位置情報を局部照明器具５０ａの局部照明用照射方向制御部５５ａに送る。検知位置情報を受け取った局部照明用照射方向制御部５５ａは照明利用者Ｍの視野内を局部照明器具５０ａが照明するように局部照明用照射方向可変モーターＭＴ１、ＭＴ２の回転を制御して局部照明器具５０ａの照射方向を変える。

【０１１１】ここで本実施形態に用いる局部照明器具５０ａ…としては図３４（ａ）乃至（ｄ）に示すようにダウンライト型の照明器具を用いる。この照明器具は有底円筒型の外部器具保持部６４と、この外部器具保持部６４内に収納され外部器具保持部６４の上面に設けられたモーターＭＴ１により水平方向に回転駆動されるようにモーターＭＴ１の駆動軸６５に上面中心が固定されている筐体６６と、この筐体６６内に配置され、一端部がモーターＭＴｂの駆動軸（図示せず）により垂直方向に回転されるように配置された灯具６７と、この灯具６７の他端内部に配置された反射板６８と、光源Ｌとからなり、モーターＭＴ１，ＭＴ２の電源線６９は対応する局部照明用照射方向制御部５５ａ…に接続され、光源Ｌからの電源線７０は対応する点灯装置５１ａ…に接続されている。

【０１１２】而して上記の人感センサー部、例えば６２ａからの検知位置情報を受け取った局部照明用照射方向制御部５５ａは、モーターＭＴ１の回転制御を行なって筐体６６を図３４（ｂ）に示す矢印方向、つまり水平方向に回転させて灯具６７の位置を照明利用者Ｍの存在方向に対応させるとともに、モーターＭＴ２の回転制御を行なって、灯具６７を図３４（ｄ）に示す矢印方向、つまり垂直方向に回転させて反射板６８及び光源Ｌａの照射角を照明利用者Ｍの視野内を照射するように可変設定する。

【０１１３】以上のように本実施形態では、作業をしている照明利用者Ｍの位置情報によって照明利用者Ｍの視野内のみを照射するよう局部照明器具５０ａ…の照射方向を自動的に変更するので、明利用者Ｍが以前と異なった位置で作業をしていても、その照明利用者Ｍの視野内の明るさ（照度）を日の出から日没までの太陽光の光量の変化の推移と対応するように変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるように制御することができるのである。

【０１１４】（実施形態１６）上記実施形態１５では、人感センサー部６２ａ…の検知した照明利用者Ｍの位置情報に基づいて局部照明器具５０ａ…の照射方向を制御するようにしていたが、本実施形態では、図３５に示すように照明利用者Ｍが持つ例えば赤外線等の光を信号媒体として利用したリモコン送信器７１から送信したリモコン信号を、図３６に示すように局部照明器具５０ａ…に付設した受信手段であるリモコン信号受光部７２ａ…が受光する。ここでリモコン信号は送信チャネル毎に照射方向を設定しており、つまり送信チャネルが照射方向情報となっており、リモコン信号受光部７２ａ…では受光したリモコン信号のチャンネルに応じて照射方向を判断してその照射方向の情報を対応する局部照明用照射方向制御部６３ａ…に送るようになっている。従って、実施形態１５と同様に照明利用者Ｍの作業場所が固定されない作業，執務室や、，会議室，机の配置等が頻繁に変わる執務室（オフィス）等に適している。而して本実施形態では、照明利用者Ｍが局部照明器具の照射方向を自分の視野内となるように対応した送信チャンネルの操作釦を操作し、例えば局部照明器具５０ａに向かってリモコン信号を送信すると、局部照明器具５０ａのリモコン信号受光部７２ａはリモコン信号の受光があったことを示す信号を対応する点灯装置５１ａ（或いは制御部５４）に送り、，その信号を受けた点灯装置５１ａ（或いは制御部５４）は対応する局部照明器具５０ａに対して調光制御動作を行なう。つまり点灯装置５１ａ…に検知信号が送られる場合には、制御部５４からの調光の制御データを有効として該制御データにより当該点灯装置が調光制御を行なう。また制御部５４に検知信号が送られる場合には制御部５４は対応する局部照明器具５０ａに対応して点灯装置５１ａ…に制御データを送り、この制

御データを受け取った当該点灯装置が調光制御を行なう。

【０１１５】上記の調光制御と同時に、リモコン信号受光部７２ａは受信チャンネルより判定した照射方向情報を対応する局部照明器具５０ａの局部照明用照射方向制御部５５ａに送り、局部照明用照射方向制御部５５ａはリモコン信号受光部７２ａからの照射方向情報に基づいて照明利用者Mの視野内に必要とする照度で照射するようにモーターＭＴ１，ＭＴ２の回転を制御して局部照明器具５０ａの照射方向を変える。

【０１１６】尚本実施形態で用いる局部照明器具５０ａ…としては実質的には図３４の構成と同じ構成を持つ図３７（ａ）乃至（ｄ）に示すダウンライト型の照明器具を用いる。ここで本実施形態の局部照明器具５０ａ…と図３４の局部照明器具５０ａ…と異なる点はリモコン受光部７２を筐体６６内に設けた点であり、このリモコン受光部７２からの信号線７３を対応する局部照明用照射方向制御部６３へ送るように外部器具保持部６４の上部より外部に導出してある。尚他の構成は図３４の構成と同じであるから同じ構成要素には同じ番号、記号を付して説明は省略する。

【０１１７】而してリモコン信号受光部５４ａ…から照射方向情報を受け取った局部照明用照射方向制御部５５ａ…は、モーターＭＴ１，ＭＴ２の回転制御を行なって灯具６７の向きと照射角を実施例１５の場合と同様に可変設定する。以上のように本実施形態では、作業をしている照明利用者Mの視野内のみを照射するように照明利用者M自身で照射方向の選択を行なって局部照明器具５０ａ…の照射方向を変更することにより、照明利用者Mが以前と異なった位置で作業をしていても、その照明利用者Mの視野内の明るさ（照度）を日の出から日没までの太陽光の光量の変化の推移と対応するように変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度となるように設定できる。

【０１１８】尚上記構成ではリモコン送信器７１から送信する情報は予め設定した照射方向を示す照射方向情報であったが、局部照明器具５０ａ…の動きをジョイステッィク等の操作手段を用いて遠隔操作する操作信号を照射方向情報としてリモコン送信器７１から送るようにすれば、照明利用者M自身の操作で最適な方向に照射方向を設定することができる。

（実施形態１７）本実施形態は、朝起きてから仕事等の目的で外出するまでの間に利用し、外出してからすぐに活動状態になるように、利用する人間を覚醒させることが要求される洗面所、ダイニング、玄関等の空間や、又は入眠するするまでに、利用する人間がくつろいだ状態になることが要求されるリビングルーム等利用する人の生体リズムを目的に応じて調整することが要求される空間等住宅用照明に適した照明システムである。

【０１１９】本実施形態の照明システムは、図３８に示すように例えば洗面所７４に設置された照明利用者Mの視野内を照射することのできる１個以上の照明器具８０とそれら照明器具８０を調光制御する機能を備えた点灯装置５１と、日の出から日没までの太陽光の光量の変化の推移と対応するように照明器具８０の光量を変化させるデータを作成するためのタイマー又は外光の明るさを検知するセンサー等からなり、太陽光の光量の変化の推移と相関な光量変化情報を出力する光量変化情報発生部５６と、光量変化情報を受けて調光データを作成して制御データとして点灯装置５１に送る制御部５４と、電力供給部５５とから構成される。

【０１２０】本実施形態では点灯スイッチＳＷがオンされると、光量変化情報発生部５６から得られた光量変化情報を基に制御部５４が点灯装置５１に制御データを送り、点灯装置５１ではその制御データに基づいて照明器具８０の光量が目的とする光量となるように調光制御を行なって利用する人間の視野を照明器具８０の照明光により照射する。但し最大光量を照射している状態で、照明器具８０を直視しても不快なグレアを感じないように、本実施形態の照明器具８０は光を拡散させる乳白パネルで光源を覆っている。

【０１２１】通常、洗面所７４は家の中で日光の入りにくい位置にあるため、覚醒レベルを上げるほど充分な光量はない。従って、顔を洗う、髪を整えるなどのために、洗面所７４に入っても、覚醒レベルは起きてからの状態とほぼ変わらないのが現状であった。しかし、この洗面所７４における本実施形態の照明システムでは、例えば、外光の光量変化と相関を持たせた光量変化で、対象とする照明器具８０の光量を変化させ、例えば朝起きてから洗面所７４で顔を洗う、髪を整えるなどの行為をした時には、覚醒効果を与える光量となるように照明器具８を調光制御して照明利用者Mの視野を照射することにより起きて間もないために覚醒レベルが下がっている状態であっても覚醒させることができ、これからの活動効率を上げる効果を照明利用者Mに与えることができる。

【０１２２】一方で、帰宅して洗面所７４で手を洗う、うがいをする等の行為をする時には、照明器具８０の光量を朝や昼間に比べて低い照度レベルで照射するように調光制御することにより、日没時の暗い中歩いて帰宅するなど暗い状態に順応している目に眩しさを与えない、帰宅時には必要とされない余分な覚醒効果与えない等、帰宅してから入眠までの間に利用する人の覚醒度を下げ、入眠前に望まれるくつろぎ状態に持っていくことができる。

【０１２３】また、夜勤等、通常の人が寝ている時間に覚醒度を上げ、活動状態に持っていくことが要求される人に対しては、職場に向かう等の外出時の夜には覚醒度を上げる朝の光量変化を、帰宅する朝には覚醒度を下げ

る夜時の光量変化にて照明器具の光量を変化させることにより、利用する人の生体リズムを夜に活動できるように調整することができる。

【０１２４】以上述べてきたように、本実施形態の照明システムでは、目的に応じた光量変化を行うことにより、照明利用者Ｍの生体リズムを目的の生体リズムにあうように調整することができる。

（実施形態１８）本実施形態の照明システムは、図３９に示すように照明利用者Ｍの存在を感知する人感センサー部６２を付加し、その人感センサー部６２から出力される照明利用者Ｍが存在しているかどうかの検知情報を受け、その検知情報に基づき、照明利用者Ｍが存在する時には対象とする照明器具８０を調光機能を持つ点灯装置５１により点灯させる機能を備えた制御部５４を設けたもので、例えば玄関７５に設置される。

【０１２５】而して本実施形態では、玄関７５に設置した照明器具８０の照射領域に人Ｍが存在する存在することを赤外線感知等の人感センサー部６２が検知すると、その検知情報を制御部５４が受け、人Ｍが存在すると検知された時には、実施形態１５と同様に構成された光量変化情報発生部５６から得られた光量変化情報を基に、制御部５４は制御データを作成して点灯装置５１に送る。点灯装置５１が受け取った制御データに基づいて照明器具８０を調光制御して目的とする光量で照明利用者Ｍの視野を照射させる。一方照明利用者Ｍが存在しないと検知されたときには、制御部５４が消灯の信号を点灯装置５１に送り、その消灯の信号を受け取った点灯装置５４は、照明器具８０を消灯させる。

【０１２６】ところで通常、玄関７５は家の中で日光の入りにくい位置にあるため、覚醒レベルを上げるはど充分な光量はない．従って、朝の外出のために玄関７５に入っても、覚醒レベルは上昇は期待できなかった。しかし、本実施形態による照明システムでは例えば外光の光量変化と相関を持たせた光量変化情報を光量変化情報発生部５６より制御部５４に与え、、朝外出のために玄関７５に照明利用者Ｍが存在する時には、覚醒効果を与える光量となるように対象とする照明器具８０の光量を調光制御して利用する人Ｍの視野を照射することにより、起きて間もないために覚醒レベルが下がっている状態の照明利用者Ｍを覚醒させ、外出してからの活動効率を上げる効果を照明利用者に与えることができる。

【０１２７】一方で、帰宅して外から玄関に入る時には、光量は朝や昼間に比べて低い照度レベルで照射するように照明器具８０を調光制御することにより、日没時の暗い中歩いて帰宅するなど暗い状態に順応している目にまぶしさを与えない、帰宅時には必要とされない余分な覚醒効果与えないなど、帰宅してから入眠までの間に照明利用者Ｍの覚醒度を下げ、入眠前に望まれるくつろげる状態に持っていくことができる。

【０１２８】尚図３９中、５５は電源たる電力供給部である。

（実施形態１９）本実施形態の照明システムは、図４０に示すように必要とされる光量の中で最低光量以上の光量で照射することのできる天井部５３より吊り下げた全般照明器具４９と、テーブル７６上に設けられ、外光の光量変化と相関を持たせた光量変化で照明利用者Ｍを照射することのできる局部照明器具５０から構成され、ダイニングルーム（食卓）７７に適用したものである。

【０１２９】而して本実施形態では、最低光量で照明しなければいけない時には、全般照明器具４９のみで照明する。スイッチSW_0はこの全般照明器具４９の点灯スイッチであり、このスイッチSW_0がオンすると点灯装置５２が全般照明器具４９を電源たる電力供給部５５’からの電力で点灯させる。それより高い照度を必要とする時には、スタンド等からなる局部照明器具５０の制御部５４が、上述の実施形態１７、１８と同様に構成された光量変化情報発生部５６から受けた光量変化情報を基に、外光の光量変化と相関を持たせた光量変化で局部照明器具５０の光量を変化させるための制御データを出力し、その制御データを受けた局部照明用の点灯装置５１はその制御データに応じた光量となるように局部照明器具５０を電源である電力供給部５５からの電力を受けて調光制御する。

【０１３０】そして、この調光制御された局部照明器具５０による照明を加えることで、必要とする光量で対象とする照明利用者Ｍの視野内を照明する。ここで本実施形態では局部照明器具５０の光量を、外光の光量変化と相関を持たせて変化させ、例えば朝食時には覚醒効果を与える光量で照明利用者Ｍの視野を照射させることにより、起きて間もないために覚醒レベルが下がっている状態の人を覚醒させ、これからの活動効率を上げる効果を照明利用者Ｍに与えることができる。一方で、帰宅してからの夕食時には、局部照明器具５０の光量を減らして朝や昼間に比べて低い照度レベルで照射させることにより、帰宅時には必要とされない余分な覚醒効果を与えないなど、夕食時に望まれるくつろいだ状態で食事をとることができるような照明状態を呈することができる。

【０１３１】尚局部照明器具５０は光源を拡散性の乳白パネル等で覆って局部照明器具５０を直視しても不快なグレアを感じないようにしてある。

（実施形態２０）上記各実施形態は、ビル、住宅等の建物内の照明システムにかかるものであったが、本実施形態は早朝に目的値に到着する夜間に走行する高速バスや寝台車、時差の大きい場所に移動する目的で利用される飛行機等、照明利用者が利用後に通常の生活活動とは異なる時刻に起床、活動、睡眠することになる乗物に適した照明システムにかかるものであり、例えば図４１に示すように飛行機に適用させたものである。

【０１３２】本実施形態では照明利用者Ｍの視野内を光量変化で照射することのできる１個以上の照明器具８０

とそれら照明器具８０を調光制御するための点灯装置５１と、実施形態１７乃至１９に用いたものと同様な構成を持つ光量変化情報発生部５６と、該光量変化情報発生部５６からの光量変化情報を受け点灯装置５１に制御データを送る制御部５４と、電源たる電力供給部５５から構成される。

【０１３３】本実施形態では光量変化情報発生部５６から得られた情報を基に、制御部５４は外光の光量変化と相関関係を持たせて照明器具８０の光量を変化させるように点灯装置５１に制御データを送り、その制御データを受け取った点灯装置５１は照明器具８０が目的とする光量で照明利用者Mの視野を照射するように調光制御を行なう。但し最大光量を照射している状態で、照明器具８０を直視しても不快なグレアを感じないように、本実施形態に用いる照明器具８０は、光を拡散させる乳白パネル（図示せず）で光源（図示せず）を覆っている。

【０１３４】この飛行機の機内照明に用いた本実施形態の照明システムでは外光の光量変化と相関を持たせた光量変化で、対象とする照明器具８０の光量を変化させることにより、出発地との時差が大きい場所に到着した時であっても、到着時が朝の場合には覚醒効果を与える朝の光量変化で利用する照明利用者Mの視野を照射することができ、従って睡眠不足のために覚醒レベルが下がっている状態の照明利用者Mを覚醒させ、到着場所における活動効率を上げる効果を照明利用者Mに与えることが可能となる。逆に夜の場合には、覚醒レベルを下げ、睡眠等の夜の活動に入りやすいような夜時の光量変化で照明利用者Mの視野を照射することにより、到着後、すぐホテルに入って寝る等、起床、活動、睡眠等の活動パターンを到着場所の通常の活動パターンにスムーズに移行でさるように生体リズムを調整できる。

【０１３５】また、本実施形態の照明システムを高速バス等通常寝ている早朝に到着する乗物に適用した場合には、バス到着時に照明利用者の覚醒レベルを上げるように光量を変化させて照明利用者を照射することにより、通常寝ている時間に到着し、覚醒レベルが下がっている照明利用者の覚醒レベルを起床・活動状態まで上げ、照明利用者が乗物から降りた後の活動に無理なく移行できるように照明利用者の生体リズムを調整することができる

（実施形態２１）本実施形態は、図４２に示すように必要とされる光量の中で最低光量以上の光量で照射するとのできる乗物内の全体を均一に照明することを目的とする全般照明器具４９と光量変化で照明利用者の視野内を照射することのできるスポットライト等からなる局部照明器具５０ａ…から構成される照明システムの実施形態であって、例えば飛行機の機内照明に適用したものである。

【０１３６】本実施形態では、外光の光量変化と相関を持たせた光量変化の中で最低光量で照明しなければいけない時、又は、そのような光量変化を照明利用者Mが必要としない時には、局部照明器具５０ａ…に付設した点灯スイッチＳＷａ…をオフにすることで、全般照明器具４９のみの光量で対象とする照明利用者Mの視野内を照射する。そして、外光の光量変化と相関を持たせた光量変化を必要とする場合で且つ全般照明器具４９で照射できる光量より高い光量を必要とするには照明利用者Mが局部照明器具５０ａ…の点灯スイッチＳＷａ…をオンにする。この場合、制御部５４が光量変化情報発生部５６から受けた光量変化情報を基に外光の光量変化と相関関係を持たせた光量変化で光量を変化させるための制御データを出力し、その制御データを受けた点灯装置５１ａ…は制御データに応じた光量となるように局部照明器具５０ａ…を調光制御する。そしてこの調光制御された局部照明器具５０ａ…による照明を加えることで、必要とする光量で対象とする照明利用者Mの視野内を照明することができるとともに、外光の光量変化と相関を持つ光量変化で、対象とする照明利用者Mの視野内の明るさを変化させることができる。ここで局部照明器具５０ａ…の光源を拡散性の乳白パネル等で覆うなどして、局部照明器具５０ａ…を直視しても不快なグレアを感じないようにする必要がある。

【０１３７】尚光量変化情報発生部５６から出力される光量変化情報は上記実施形態２２と同様に局部照明器具５０ａ…を調光制御するようなデータからなる。図中５２は全般照明器具４９の点灯装置、５５はシステム全体の電源たる電力供給部である。

【０１３８】

【発明の効果】請求項１の発明は、屋内の照明を行う照明負荷と、該照明負荷の点灯を制御して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明負荷で照明される照明域の照度を変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とする点灯制御手段とを備えたことを特徴とし、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とするので、生体リズム調整することができるとともに、日中の覚醒度低下を抑制して覚醒度を維持することができ、また屋内全体の照明を自動的に制御することにより、個々の照明負荷のオンオフ等の手間や着脱等が不要となり、病院・老人ホーム・地下街・オフィス等の照明に有効なシステムを構築できるという効果がある。

【０１３９】請求項２の発明は、請求項１の発明において、点灯制御手段は、既知の日の出から日没までの太陽光の光量の変化の推移に対応させて予め設定した点灯制御パターンに基づいて照明負荷の点灯を制御することを特徴とし、太陽光を受光して点灯制御を行わないため、点灯制御パターンを生体リズムに最適な形や使用状況に応じた形の点灯制御パターンを予め設定でき、そのため外光の光量を受光する手段等が不要でその分システム構

成も簡単になる。

【０１４０】請求項３の発明は、屋内の照明を行う照明負荷と、太陽光を受光してその光量と相関を有する信号を出力する受光部、受光部の出力信号と相関を有して照明負荷の点灯電力の大きさを設定する電力制御部、該電力制御部で設定される点灯電力で照明負荷を点灯する点灯装置、照明負荷に点灯装置を介して点灯電力を供給する電力供給部からなる点灯制御手段とを備えたので、太陽光と相関を有するような照度を自動的に得ることができ、生体リズム調整を自然のリズムを取り戻す形であるいは覚醒度を維持する形で行うのに有効となる上に、個々の照明負荷のオンオフ等の手間や着脱等が不要となり、病院・老人ホーム・地下街・オフィス等の照明に有効なシステムを構築できるという効果がある。

【０１４１】請求項４の発明は、請求項３の発明において、予め下限となる点灯電力レベルを設定した電力レベル設定部を備え、電力制御部は受光部の出力信号に対応した点灯電力と電力レベル設定部で設定した点灯電力とを比較して大きい方の点灯電力に対応するように照明負荷の点灯電力の大きさを制御するので、必要最小限の照度を確保することができて、室内照明としての実用性を持たせることができるという効果がある。

【０１４２】請求項５の発明は、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と予め下限となる電力レベルを設定した電力レベル設定部とを備え、電力制御部は電力供給部の供給電力が電力レベル設定部で設定したレベルの点灯電力より下回る場合予備電力供給部の電力を電力供給部の供給電力に加算して照明負荷に供給するように制御するので、外光と関係なく必要最小限の照度を得るための点灯電力を確保するための電力源を別に用意しておくことにより、必要最小限の照度を得るための点灯電力を確保して室内照明としての実用性をもたせることができるという効果がある。

【０１４３】請求項６の発明は、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と、照明負荷に対して電力供給部のみの電力を供給するか電力供給部の電力に予備電力供給部の電力を加算した電力を供給するかを選択するスイッチ部とを付加したので、電力供給部の電力が少ない時には照明負荷の点灯電力を一定値にして必要最小限の照度を確保することができ、また電力供給部の電力が十分な時には予備電力供給部を切り離して、外光と相関を有する照度となるように照明負荷の点灯を制御することができるという効果がある。

【０１４４】請求項７の発明は、請求項３の発明において、電力制御部の制御とは無関係に電力を供給する予備電力供給部と予備電力供給部に接続される定照度照明負荷とを付設して成るので、室内で外光と相関を有する照明を必要とする部分で選択的に利用することができるとともにその他の部分では常に一定の電力を確保して室内照明としての実用性をもたせることができるという効果がある。

【０１４５】請求項８の発明は、請求項４、５の発明において、電力レベル設定部で設定する電力レベル値を時刻によって変化させるので、夜間就寝中は暗く昼間活動時には明るくするなど、室内照明に必要な明るさを時刻によって異なるレベルに設定することができるという効果がある。請求項９の発明は、請求項３の発明において、受光部と電力供給部とを同一の太陽電池で構成すること特徴とし、設備を小さくして合理的なシステムを提供でき、外光と相関を有する照明システムにおいて実用性を更に高めることができるという効果がある。

【０１４６】請求項１０の発明は、請求項５～７の発明において、受光部と電力供給部とを同一の太陽電池で構成し、予備電力供給部を商用電源と整流器とで構成したので、設備を小さくして合理的なシステムを提供できるだけでなく、太陽光を利用して商用電力消費を節約し妥当な量にすることができるという効果がある。請求項１１の発明は、請求項３、７、８の発明において、電力供給部若しくは太陽電池の出力に低周波通過フィルタを付加して平滑化した電力を照明負荷の点灯電力として供給するので、平滑化した電力を負荷である照明装置に供給でき、室内の明るさが小さい時定数では変化しないようになり、外光と相関を有する電力が、例えば雲が太陽を横切るなどの外光の細かい変動にそのまま反応して変化して室内照明の明るさが頻繁にかつ大きく変化して室内での生活に支障がでるだけでなく目にも悪影響が生じる等の恐れがないという効果がある。

【０１４７】請求項１２の発明は、請求項８の発明において、電力レベル設定部で、夜間は小さく昼間は大きな値とし、朝の移行期と夕方の移行期にはそれぞれ晴天時の日の出と日没をシミュレートするように電力設定値を時間変化させるので、昼間は明るく夜間は暗くというように昼夜で明るさのメリハリをつけるとともに、昼夜の切り換わりでは照度変化が急激にならないようにして、生体リズム調整機能を向上させることができるという効果がある。

【０１４８】請求項１３の発明は、請求項３、９、１０の発明において、受光部あるいは太陽電池において、日の出方角に受光面が向くように設置することを特徴とする昼間は明るく夜間は暗くというように昼夜で明るさのメリハリをつけ昼夜の切り扱わりでは照度変化が急激にならないようにするとともに、外光と相関を有する照度変化の中で朝の光を特に重要視して利用することができ、生体リズム調整機能をさらに向上させることができるという効果がある。

【０１４９】請求項１４の発明は、請求項３、９、１０の発明において、受光部あるいは太陽電池に、受光面可動部と太陽方位判定手段とを付加して、受光部あるいは

太陽電池の受光面が太陽の方角を追従するように太陽方位判定手段の判定出力に基づいて受光面可動部を制御するので、受光面が太陽の方角を追従するように制御することができ、日照不足がちの住環境への光補充を目的とする場合に、できるだけ光を多く室内に取り入れることができるという効果がある。

【０１５０】請求項１５の発明は、請求項３、９、１０の発明において、建物に設けた採光窓の方向に受光部あるいは太陽電池の受光面が向くように設置するので、窓から入射する外光と相関を有する照明を窓際に配置して窓際照明での照度補正の性能を向上させることができるという効果がある。請求項１６の発明は、請求項１又は２の発明において、照明域の日没以後の照度が作業に適する照度となるように照明負荷の点灯を制御するので、実作業上問題とならず必要な照度を確保できるという効果がある。

【０１５１】請求項１７の発明は、請求項１又は２の発明において、照明域の正午付近の照度が少なくとも休息に適する照度となるように照明負荷の点灯を制御するので、午後の覚醒度低下の時期において一度休息が取れ、その後の作業効率をより向上させることができるという効果がある。請求項１８の発明は、請求項１又は２の発明において、照明域の照度の変化が連続的且つ徐々なる変化であるので、自然光の変化に近づけて自然のリズムを取り戻すことや維持することがし易くなるという効果がある。

【０１５２】請求項１９の発明は、請求項１の発明において、高い照度として１０００～５０００ｌｘの範囲の照度を設定したので、覚醒度の向上が図れるという効果がある。請求項２０の発明は、請求項１６において、作業に適する照度として５００～９００ｌｘの範囲の照度を設定したので、作業効率の向上が図れるという効果がある。

【０１５３】請求項２１の発明は、請求項１７の発明において、休息に適する照度として３００～６００ｌｘの範囲の照度を設定したので、休息に有効となるという効果がある。請求項２２の発明は、請求項１又は２の発明において、照明域の午前の平均照度を照明域の午後の平均照度よりも大としたので、覚醒維持がし易いという効果がある。また、生体リズムを調整できるという効果もある。

【０１５４】請求項２３の発明は、請求項１、２、１８において、午前の照明域の照度の上昇速度を午後の照明域の照度の下降速度よりも大としたので、覚醒維持がし易いという効果がある。また、生体リズムを調整できるという効果もある。請求項２４の発明は、正午前後に設定される高い照度期間中に照度変化の揺らぎを持たせたので、覚醒維持がよりし易いという効果がある。

【０１５５】請求項２５の発明は、請求項２１又は２４の発明において、照明域の照度が高いレベルから低いレベルへ下降する速度を低いレベルから高いレベルへ上昇する速度よりも小さくしたので、覚醒度を向上させるのに有効となるという効果がある。請求項２６の発明は、請求項２４の発明において、照明域の照度変化の周期にゆらぎを持たしたので、覚醒度を維持するのにより有効となるという効果がある。

【０１５６】請求項２７の発明は、請求項１又は２の発明において、照明負荷は、基本照度を得るための基本照明負荷と、基本照度に重畳する形で特定の照明域の照度を変化させるためのタスク照明負荷と、タスク照明負荷の点灯制御の要、不要を設定する手段とを備え、少なくとも特定の照明域の照度が日の出から日没までの太陽光の光量の変化の推移するようにしたので、全体の照明による電力消費を抑えつつ、個人レベルでの生体リズムの調整が可能な点灯制御ができるという効果がある。

【０１５７】請求項２８の発明は、請求項１の発明において、作業、業務に必要な最低限度の照度を確保する全般照明器具を設けるとともに、必要とする場所の照明を担う局部照明器具を点灯制御手段で制御される照明負荷として設けたので、必要なところにのみ局部照明器具によって高照度で照射することができ、そのため少ない点灯エネルギーで照明利用者の個人レベルでの生体リズムの調整が可能な点灯制御ができるという効果がある。

【０１５８】請求項２９の発明は、請求項２８の発明において、照明利用者の存否を検知する検知手段を付設し該検知手段により照明利用者の存在が検知されると照明利用者の視野内の照度を局部照明器具の照明で変化させるので、照明利用者が存在するときにのみ制御を行なうので、無駄が無くなるという効果がある。請求項３０の発明は、請求項２８又は２９の発明において、局部照明器具として照射方向を照明利用者の位置に合わせて可変制御される照明器具を用いたので、局部照明器具の下にいなくとも、照明利用者の視野内に必要な照度を与えることができ、照射しなければならないと考えられる全ての場所を考慮して照明器具を設置する必要が無くなるので、局部照明器具の台数が少なく済む。

【０１５９】請求項３１の発明は、請求項３０の発明において、送信手段から送信された照射方向情報を受信手段で受信して該照射方向情報に基づいて局部照明器具の照射方向を照明利用者の位置方向に変化させるので、送信手段を照明利用者自身が操作して照射方向情報を送信させることにより所望する方向に局部照明器具の照射方向を設定できるため、照明利用者の存在位置方向に容易に照射方向を設定でき、照明利用者の視野内に必要な照度を与えることが可能となるという効果がある。

【０１６０】請求項３２の発明は、請求項１の発明において、照明負荷が住宅用照明器具であるので、生活環境において、照明利用者の生体リズムの調整が可能な照明が得られるという効果がある。請求項３３の発明は、乗物内の照明を行う照明器具と、該照明器具の点灯を制御

して、日の出から日没までの太陽光の光量の変化の推移と対応するように前記照明器具で照明される照明域の照度を変化させるとともに、少なくとも正午前後の所定期間中前記照度を午前或いは午後の平均照度より高い照度とする点灯制御手段とを備えたので、時差や、到着時刻等に対応して、照明利用者の生体リズムの調整が可能な点灯制御ができるという効果がある。

【図面の簡単な説明】

【図１】本発明の実施形態１のシステム構成図である。

【図２】同上の電力制御部の動作説明用波形図である。

【図３】同上における外光変化と、照度変化の関係を示す説明図である。

【図４】本発明の実施形態２のシステム構成図である。

【図５】同上における外光変化と、照度変化の関係を示す説明図である。

【図６】本発明の実施形態３のシステム構成図である。

【図７】本発明の実施形態４のシステム構成図である。

【図８】本発明の実施形態５のシステム構成図である。

【図９】本発明の実施形態６のシステム構成図である。

【図１０】同上による照度変化の説明図である。

【図１１】本発明の実施形態７のシステム構成図である。

【図１２】本発明の実施形態８のシステム構成図である。

【図１３】同上による照度変化の説明図である。

【図１４】本発明の実施形態９のシステム構成図である。

【図１５】本発明の実施形態１０のシステム構成図である。

【図１６】本発明の実施形態１１のシステム構成図である。

【図１７】同上に用いる点灯制御パターンの例図である。

【図１８】同上に用いる別の点灯制御パターンの例図である。

【図１９】同上に用いる他の点灯制御パターンの例図である。

【図２０】本発明の実施形態１２のシステム構成図である。

【図２１】同上に用いる点灯制御パターンの例図である。

【図２２】本発明の実施形態１３の一例のシステム構成図である。

【図２３】同上の回路構成図である。

【図２４】本発明の実施形態１３の他例のシステム構成図である。

【図２５】本発明の実施形態１３に用いる局部照明器具の他の例の説明図である。

【図２６】同上の局部照明器具の要部の拡大断面図である。

【図２７】（ａ）は同上の局部照明器具の拡大側面図である。（ｂ）は同上の局部照明器具の拡大正面図である。

【図２８】（ａ）は本発明の実施形態１３に用いる局部照明器具のその他の例の水平断面図である。（ｂ）は同上のスタンド部筐体の正面図である。（ｃ）は同上のスタンド部筐体の側面図である。

【図２９】同上の使用説明図である。

【図３０】本発明の実施形態１４のシステム構成図である。

【図３１】同上の回路構成図である。

【図３２】本発明の実施形態１５のシステム構成図である。

【図３３】同上の回路構成図である。

【図３４】（ａ）は同上に用いる局部照明器具の斜視図である。（ｂ）は同上に用いる局部照明器具の下面図である。（ｃ）は同上に用いる局部照明器具の側断面図である。（ｄ）は同上に用いる局部照明器具の灯具を回転させた状態の側断面図である。

【図３５】本発明の実施形態１６のシステム構成図である。

【図３６】同上の回路構成図である。

【図３７】（ａ）は同上に用いる局部照明器具の斜視図である。（ｂ）は同上に用いる局部照明器具の下面図である。（ｃ）は同上に用いる局部照明器具の側断面図である。（ｄ）は同上に用いる局部照明器具の灯具を回転させた状態の側断面図である。

【図３８】本発明の実施形態１７のシステム構成図である。

【図３９】本発明の実施形態１８のシステム構成図である。

【図４０】本発明の実施形態１９のシステム構成図である。

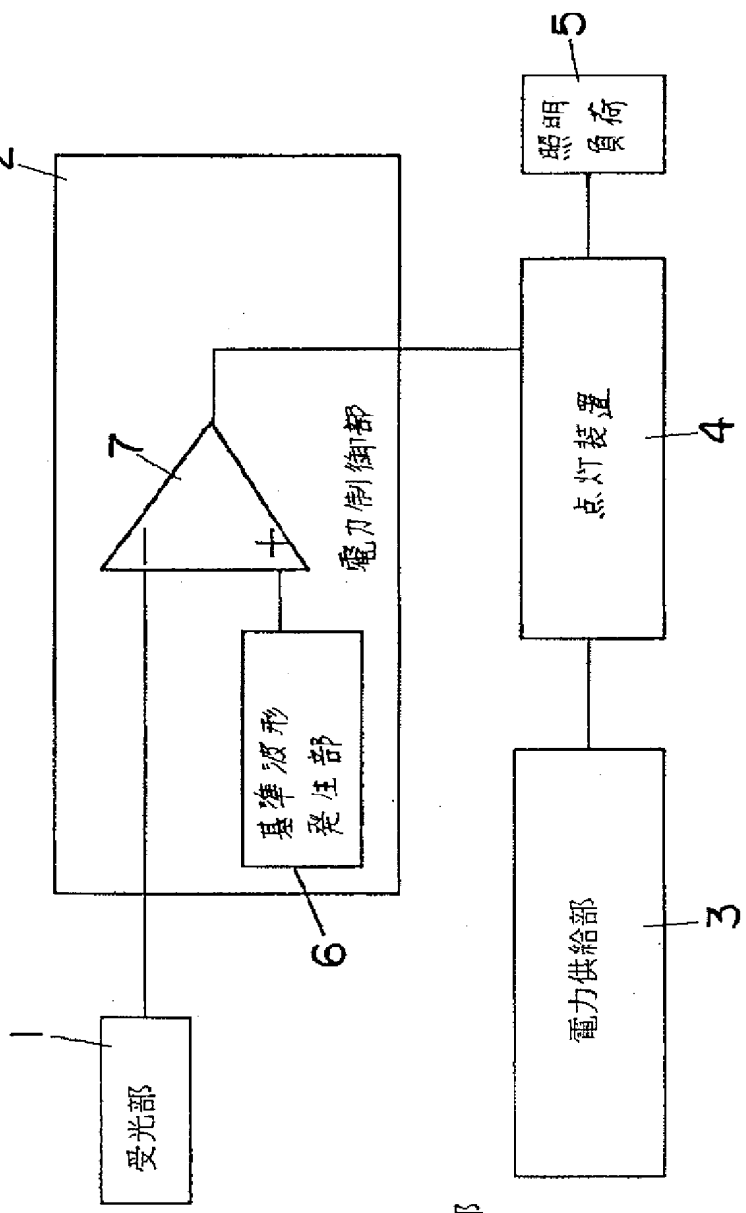
【図４１】本発明の実施形態２０のシステム構成図である。

【図４２】本発明の実施形態２１のシステム構成図である。

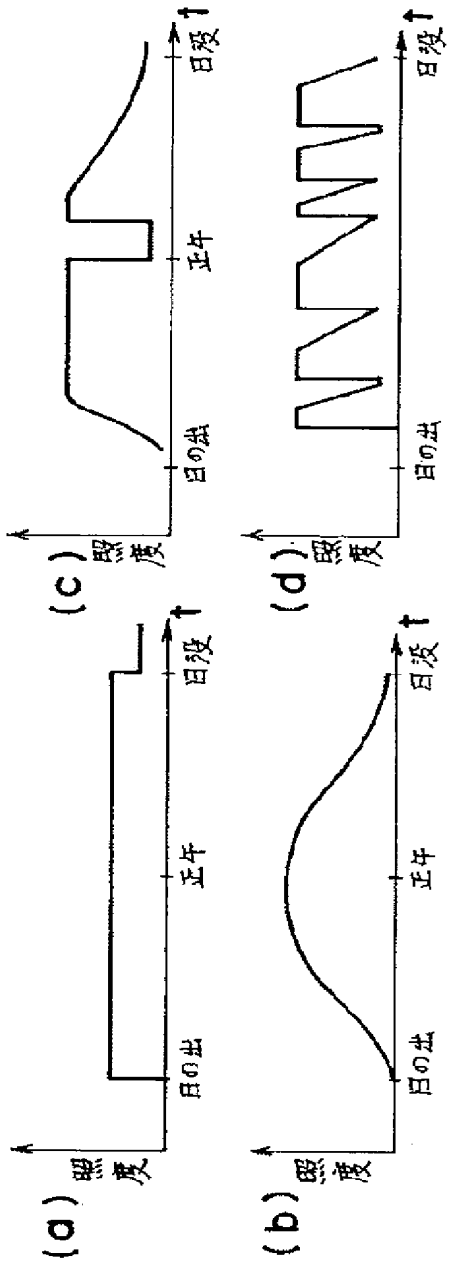
【符号の説明】

1　受光部
2　電力制御部
3　電力供給部
4　点灯装置
5　照明負荷
6　基準波形発生部
7　比較部

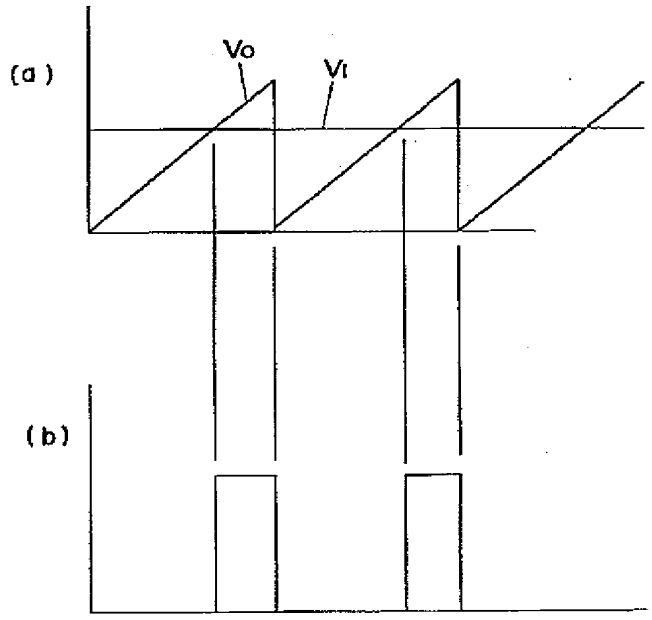
【図１】



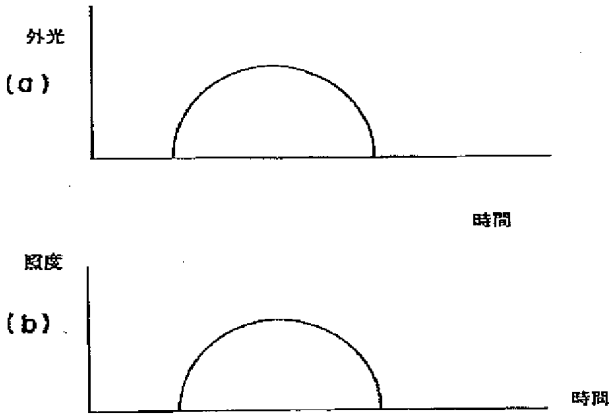
【図２１】



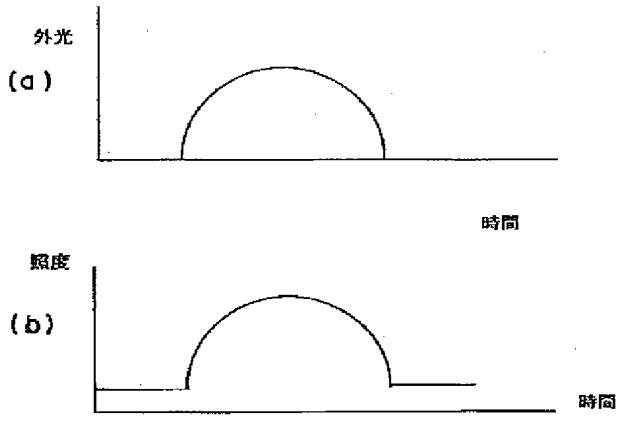
【図２】



【図３】

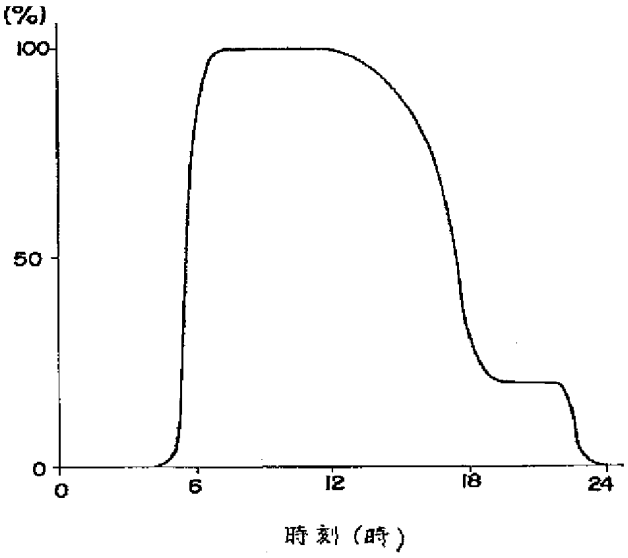


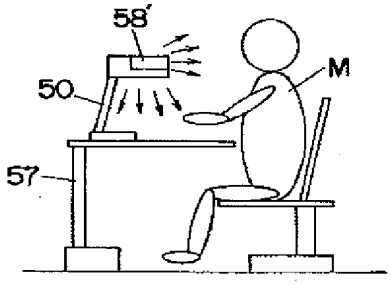
【図５】



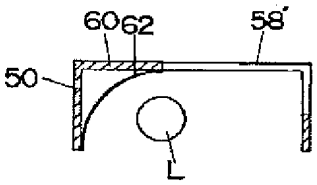
【図２５】

【図１０】

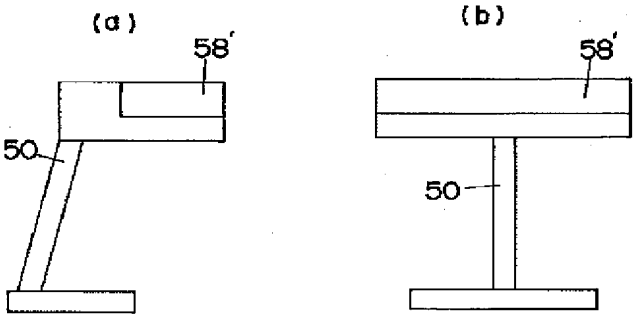




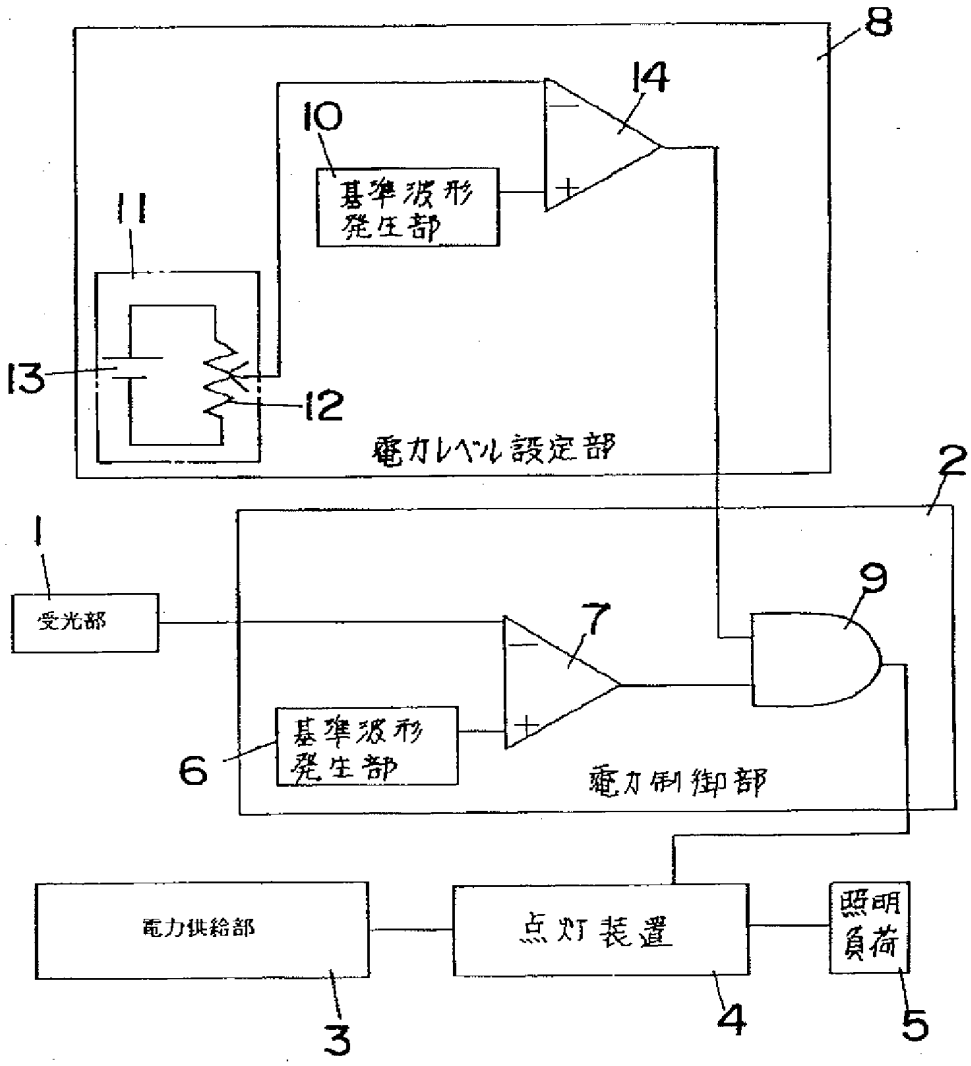
【図２６】



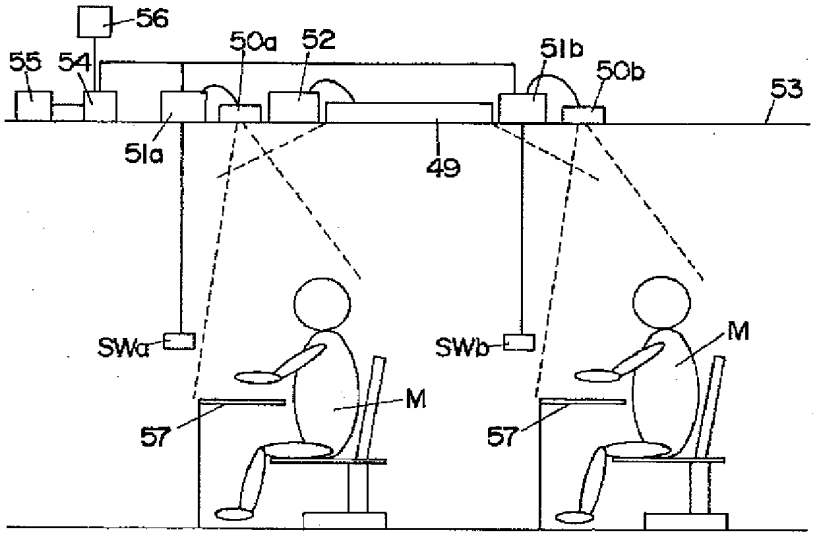
【図２７】



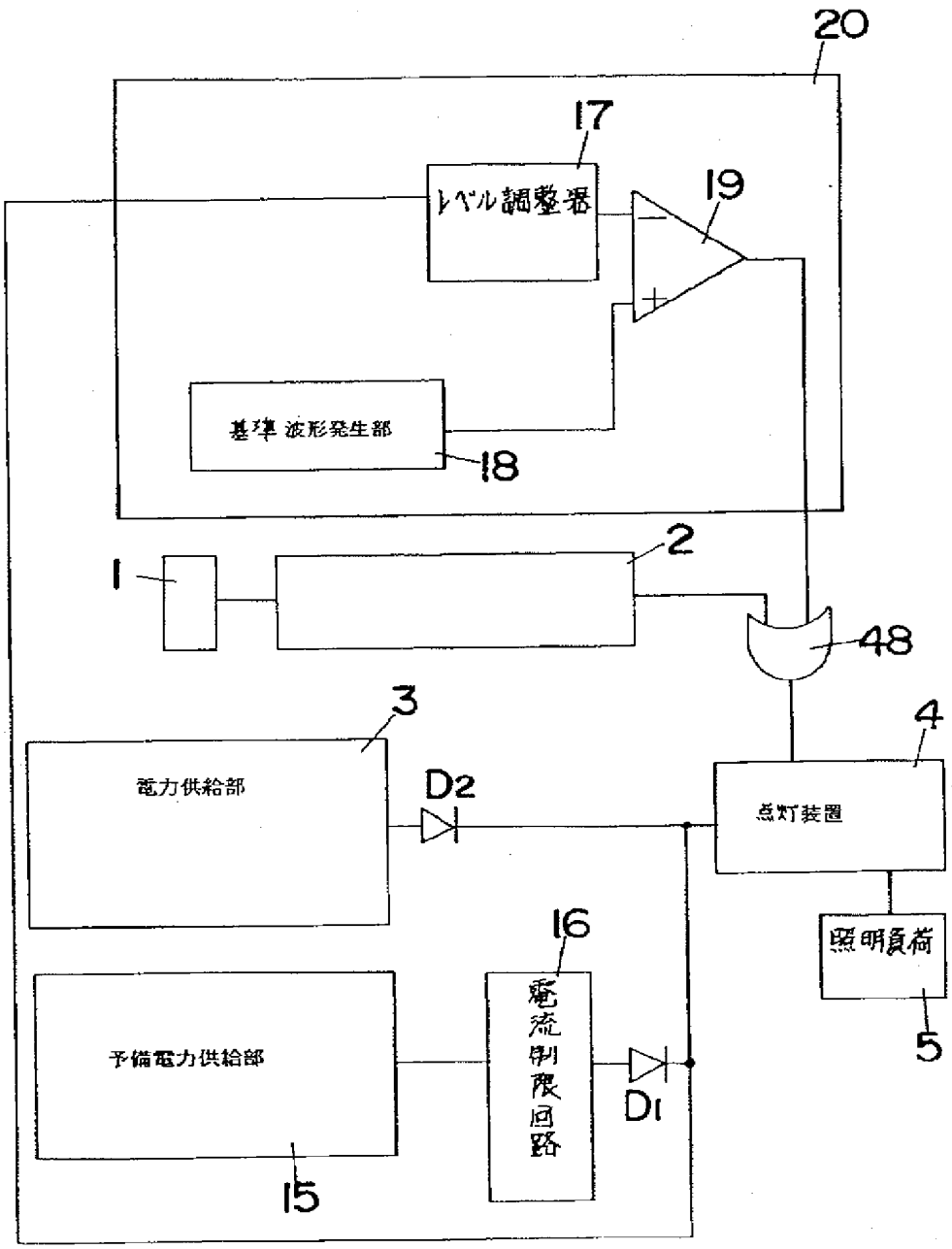
【図４】


8
14
10
基準波形発生部
11
13
12
電力レベル設定部
2
1
受光部
9
7
6
基準波形発生部
電力制御部
電力供給部
点灯装置
照明負荷
3
4
5

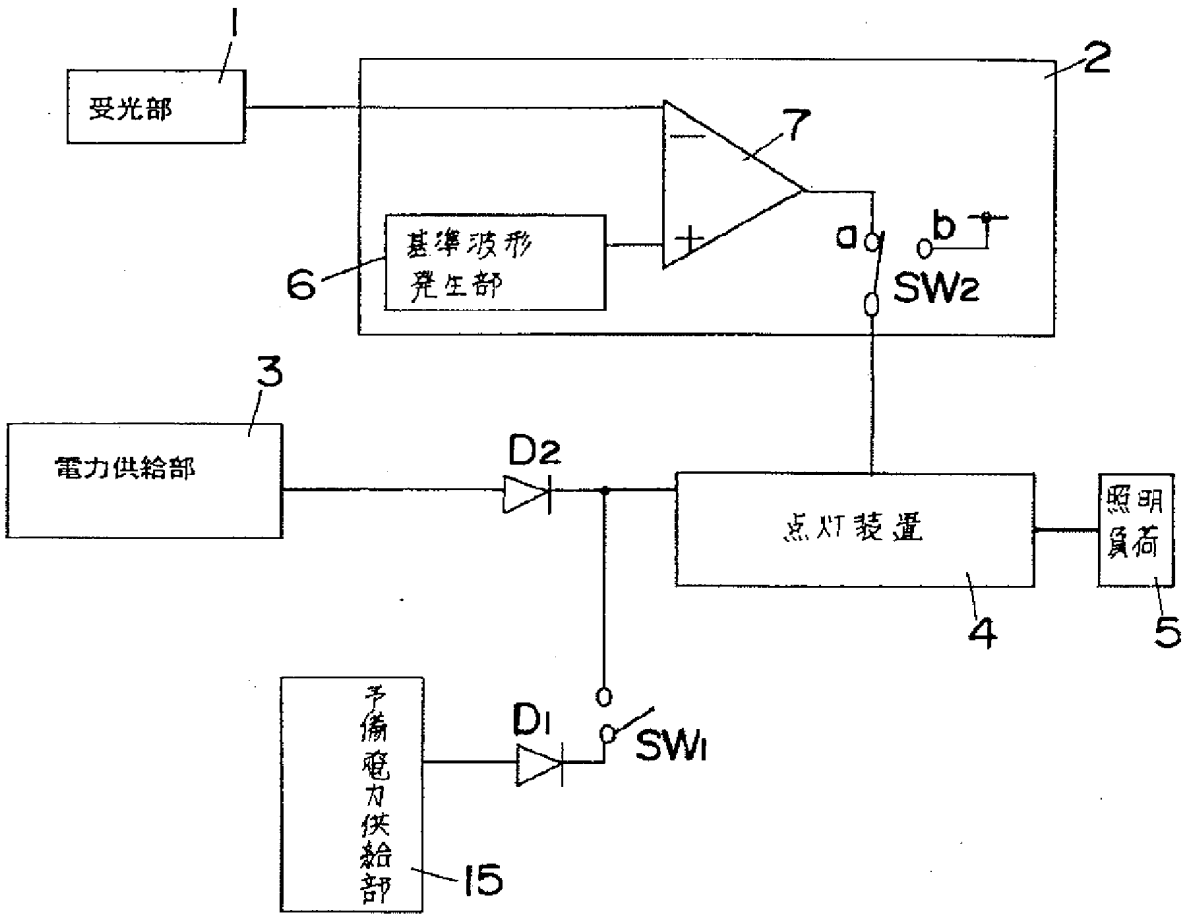
【図２２】


56
55
54
50a
52
51b
50b
53
51a
49
SWa
SWb
M
57
M
57

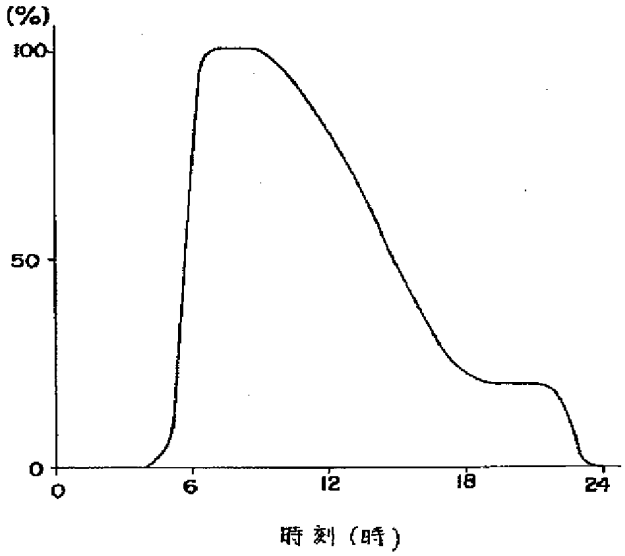
【図６】


20
17
レベル調整器
19
基準波形発生部
18
1
2
48
3
電力供給部
D2
4
点灯装置
照明負荷
5
16
予備電力供給部
電流制限回路
D1
15

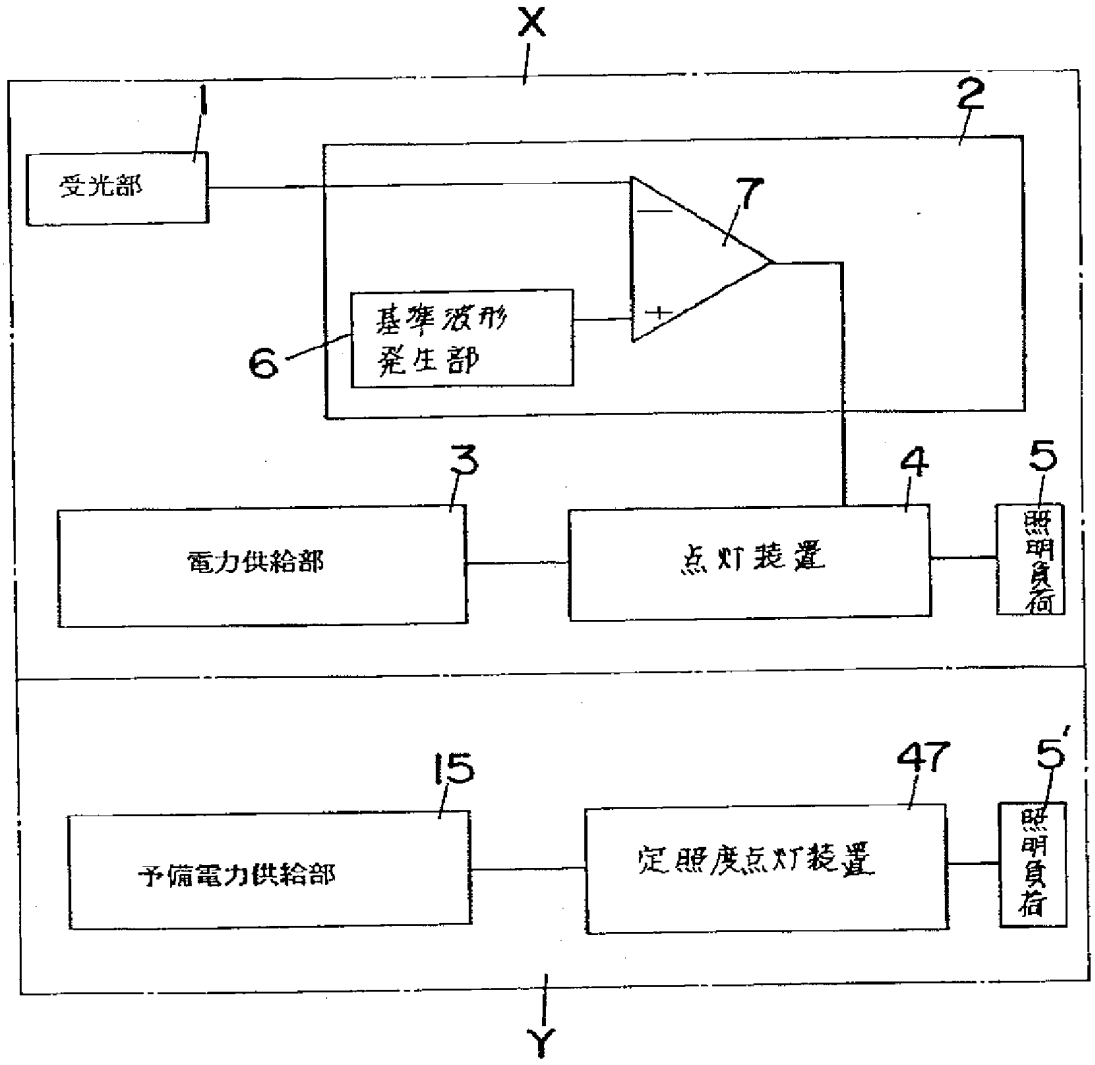
【図７】


1
受光部
2
7
基準波形
発生部
6
a
b
SW2
3
電力供給部
D2
点灯装置
照明
負荷
4
5
予備電力供給部
15
D1
SW1

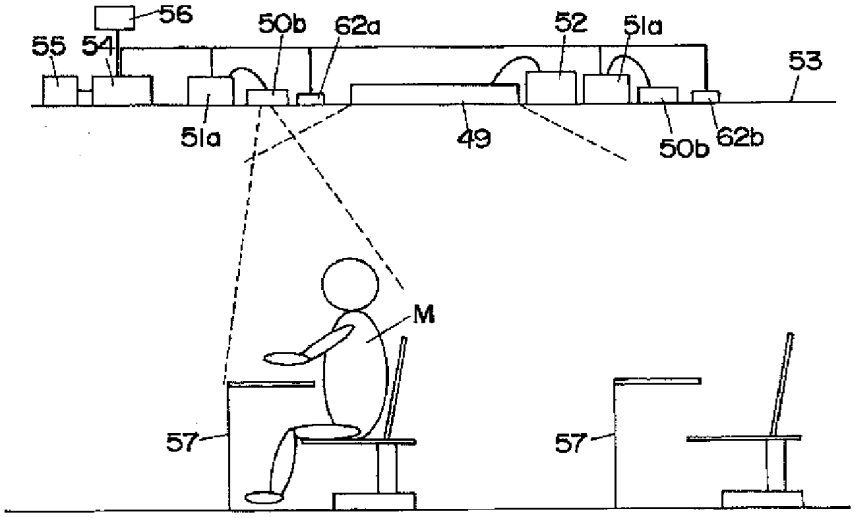
【図１３】


(%)
100
50
0
0
6
12
18
24
時刻（時）

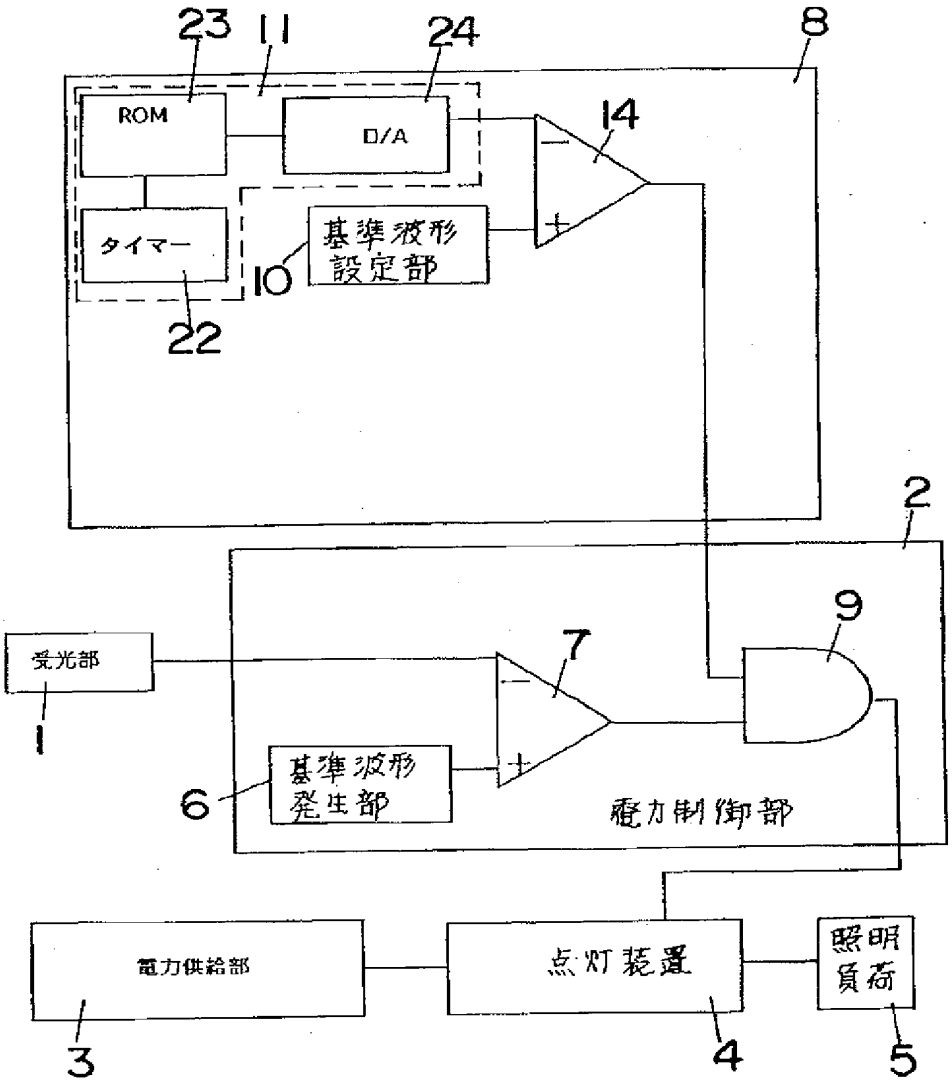
【図８】


X
1
2
受光部
7
基準波形
発生部
6
3
4
5
電力供給部
点灯装置
照明負荷
15
47
5'
予備電力供給部
定照度点灯装置
照明負荷
Y

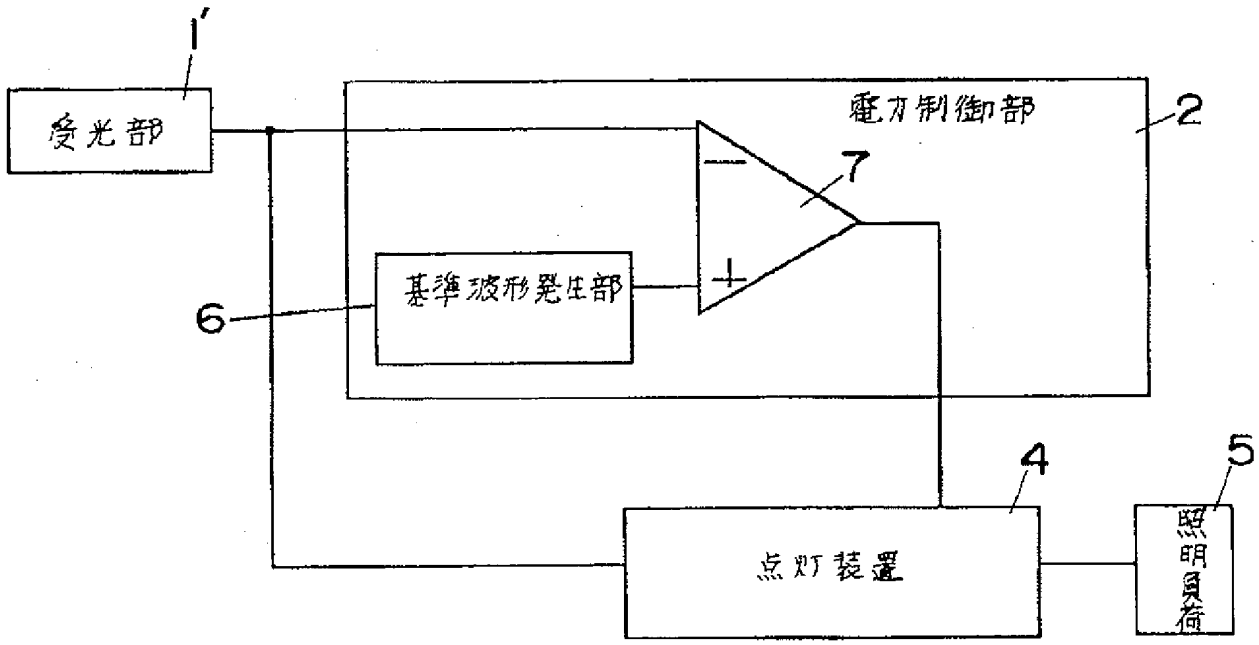
【図３０】


56
55
54
50b
62a
52
51a
53
51a
49
50b
62b
M
57
57

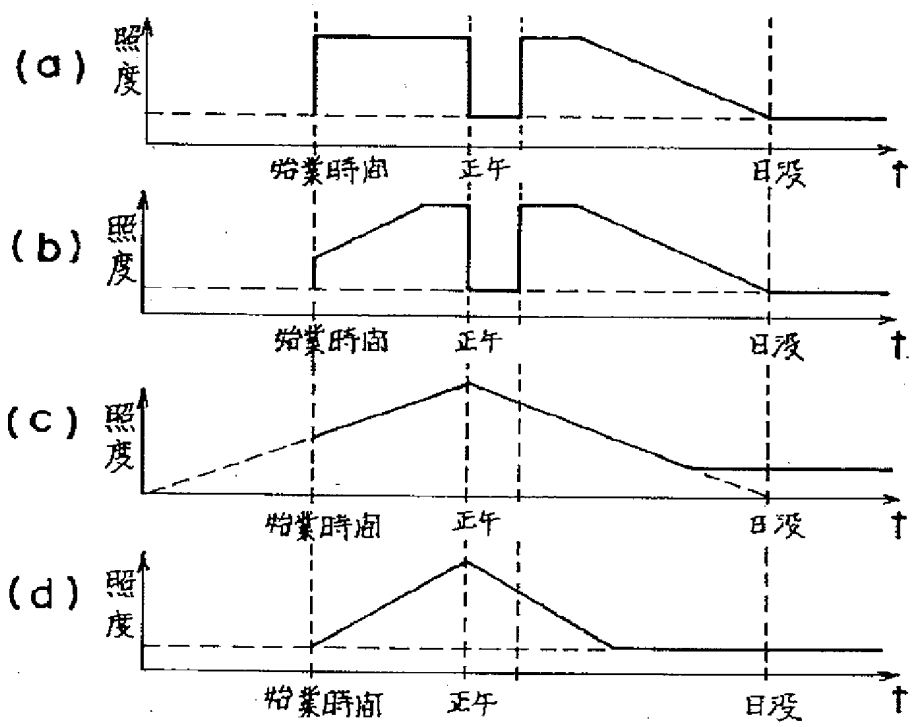
【図９】


23
11
24
8
ROM
D/A
14
タイマー
基準波形
設定部
10
22
2
受光部
9
7
1
基準波形
発生部
6
電力制御部
電力供給部
点灯装置
照明
負荷
3
4
5

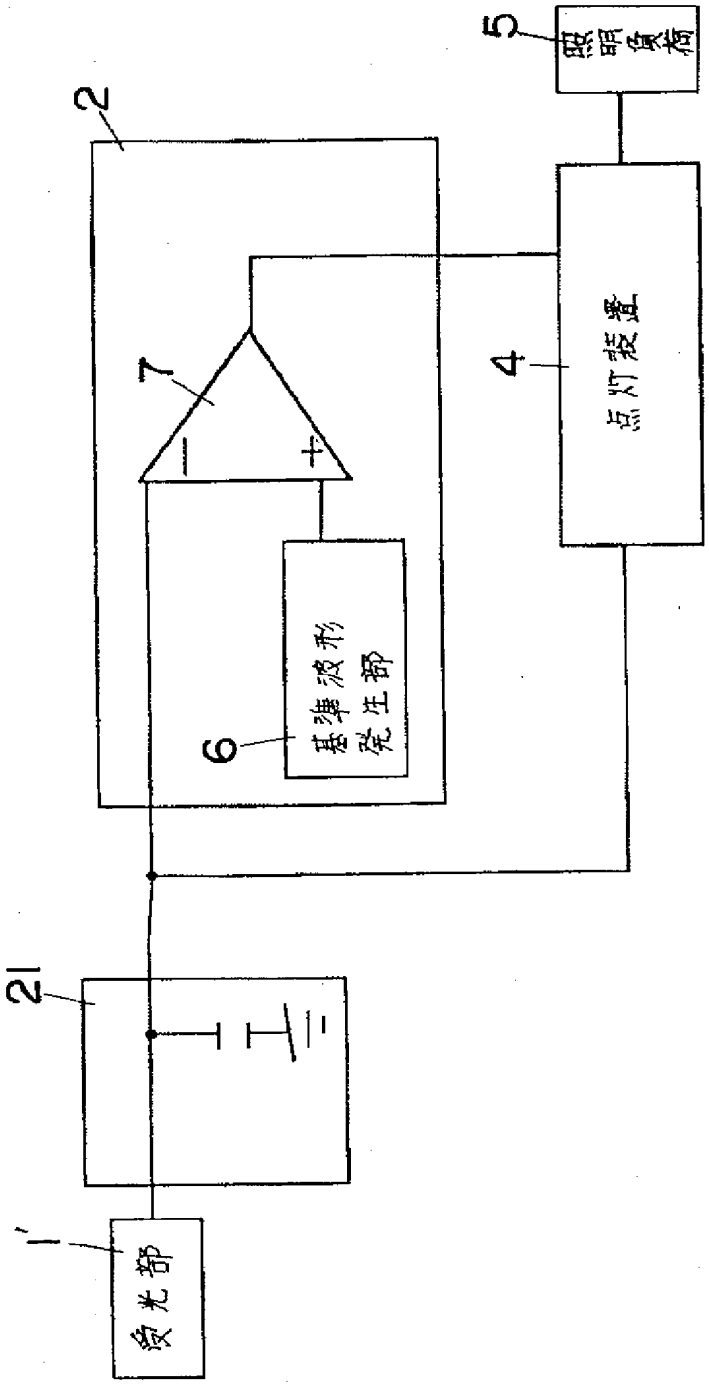
【図１１】


1'
受光部
電力制御部
2
7
基準波形発生部
6
4
5
点灯装置
照明負荷

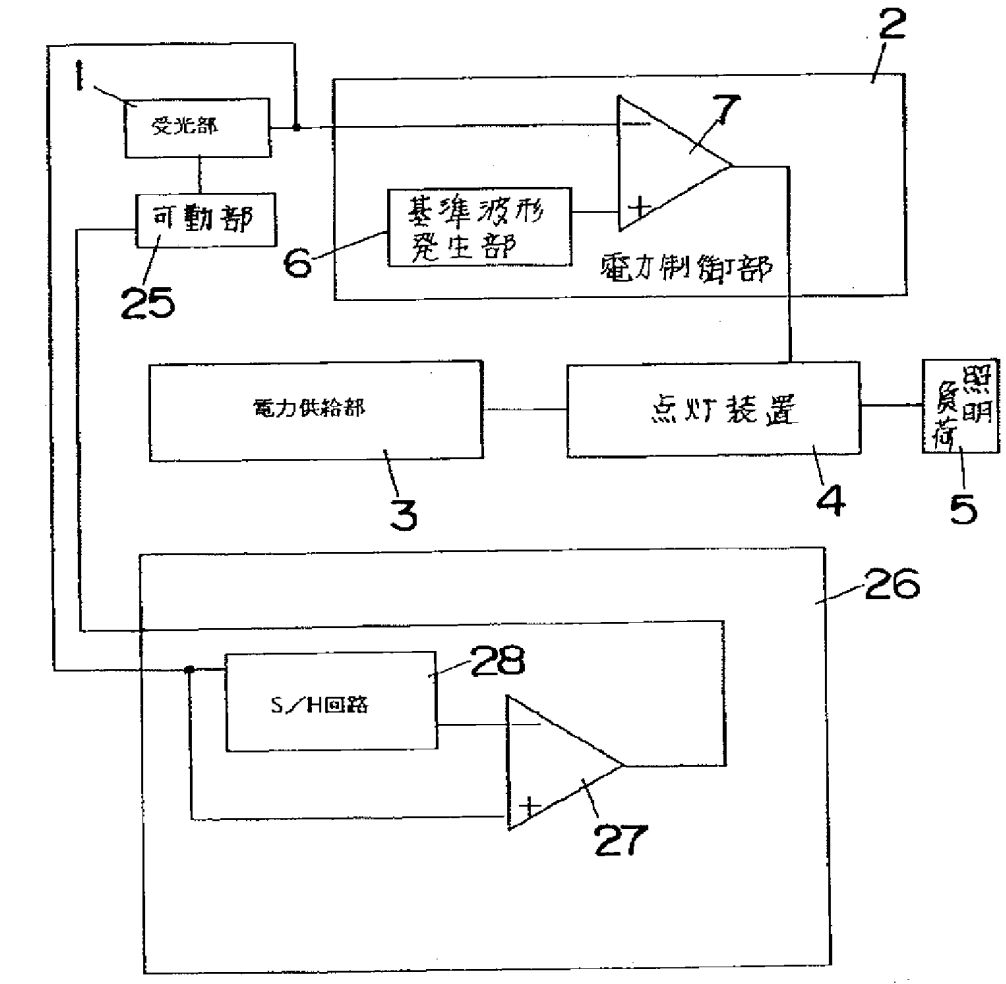
【図１９】


(a)
照度
始業時間
正午
日没
t
(b)
照度
始業時間
正午
日没
t
(c)
照度
始業時間
正午
日没
t
(d)
照度
始業時間
正午
日没
t

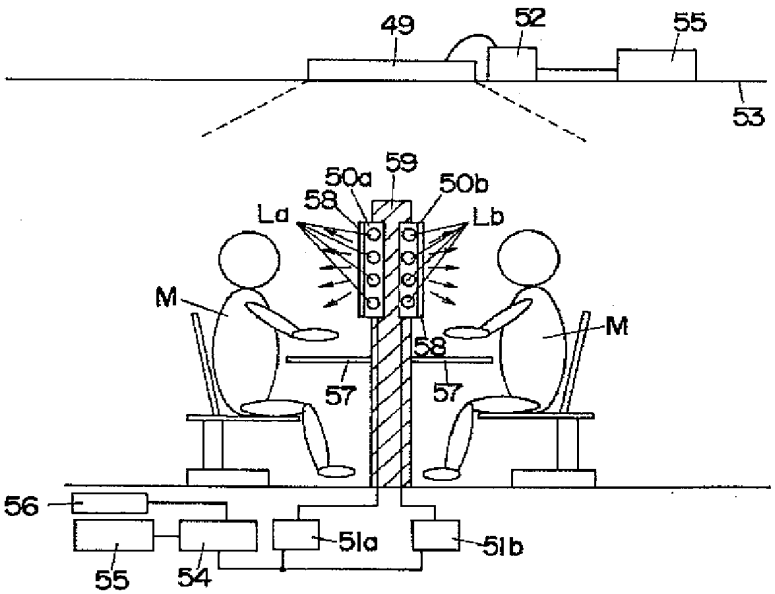
【図１２】



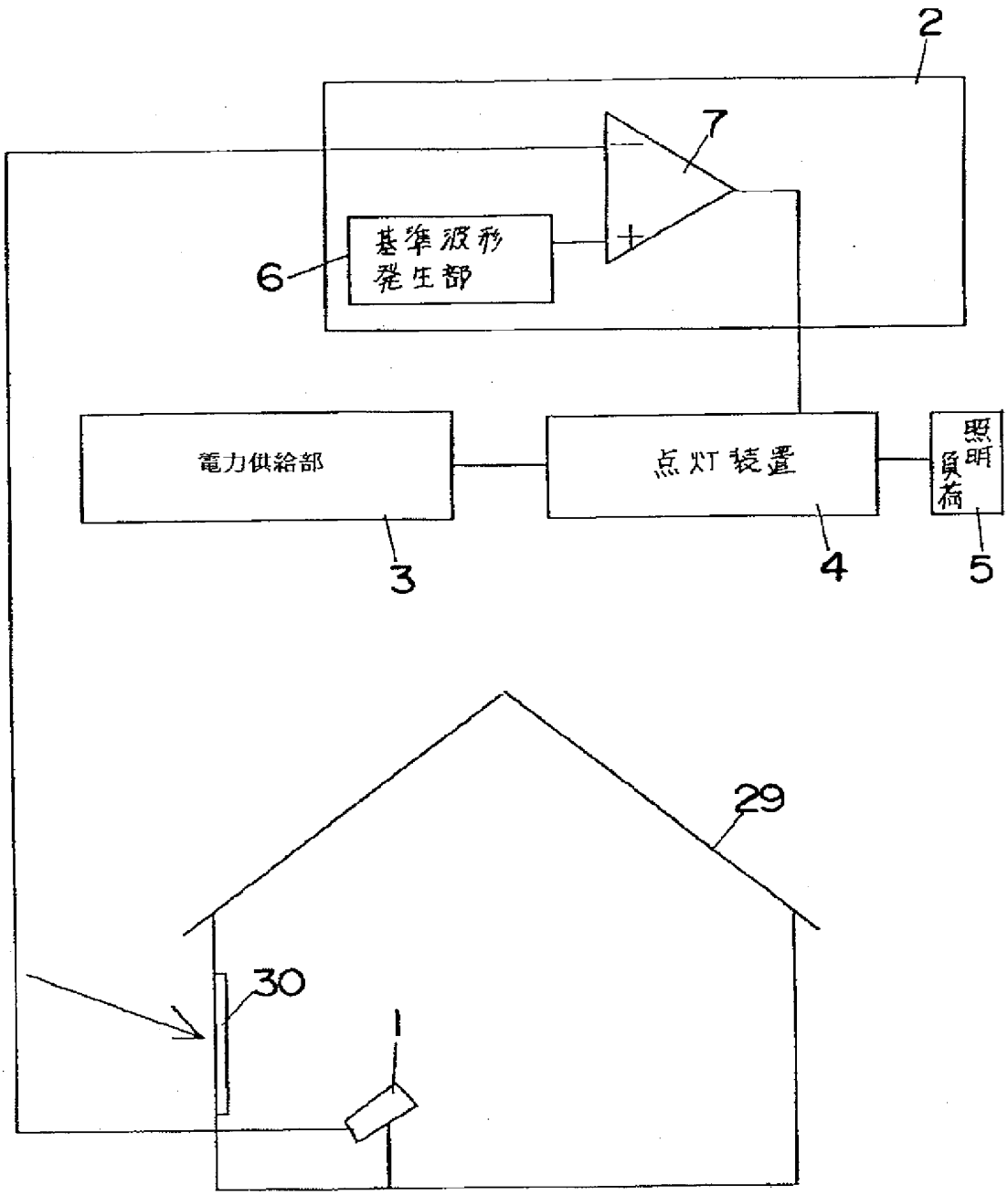
【図１４】


2
1
受光部
7
可動部
基準波形発生部
6
電力制御部
25
電力供給部
点灯装置
照明負荷
3
4
5
26
28
S／H回路
27

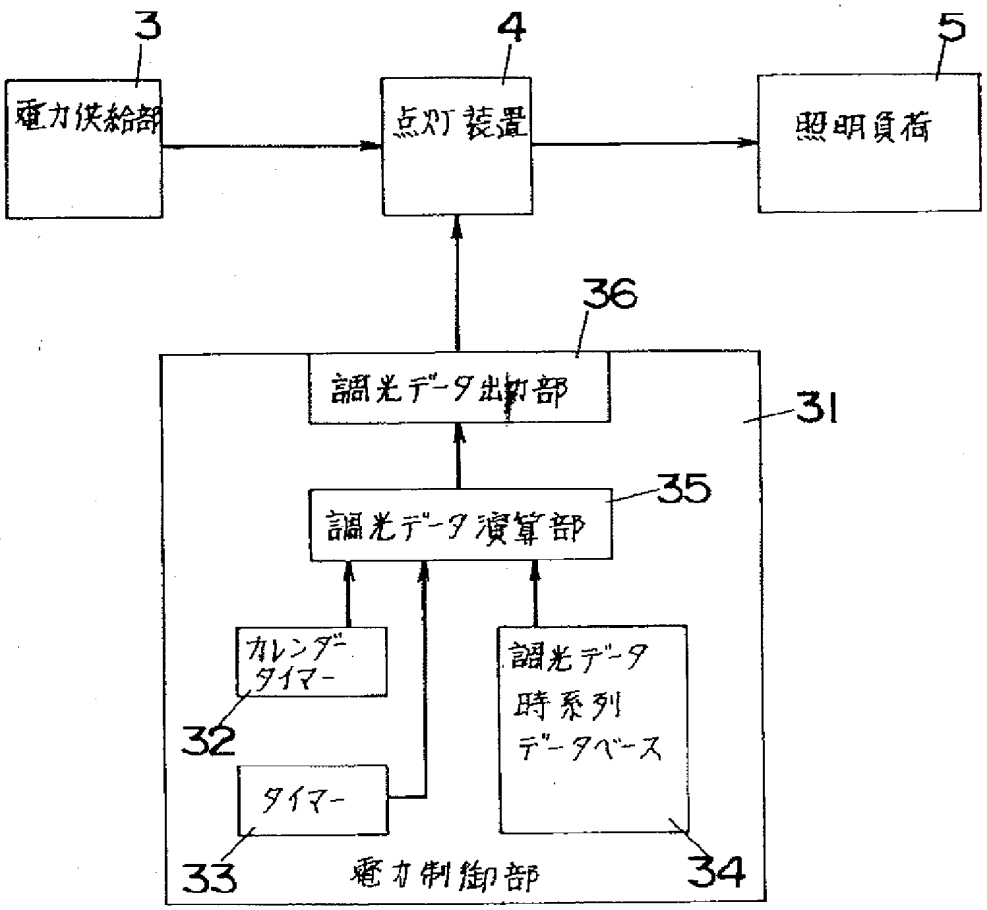
【図２４】


49
52
55
53
50a
59
50b
58
La
Lb
M
M
58
57
57
56
55
54
51a
51b

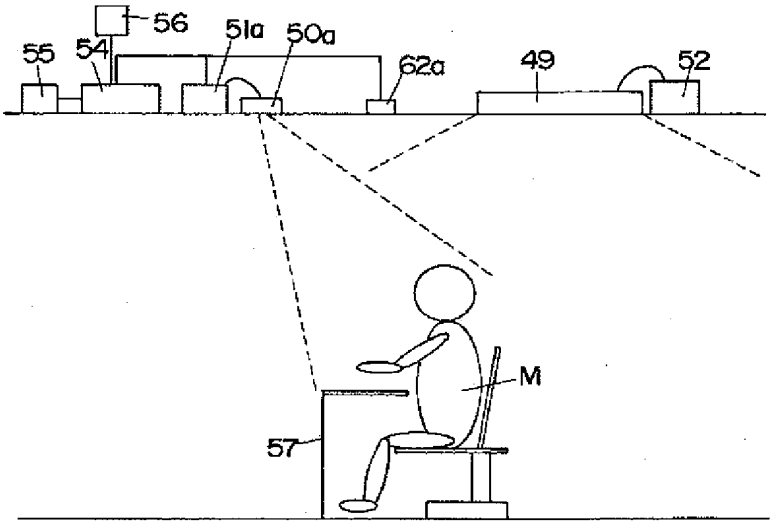
【図１５】



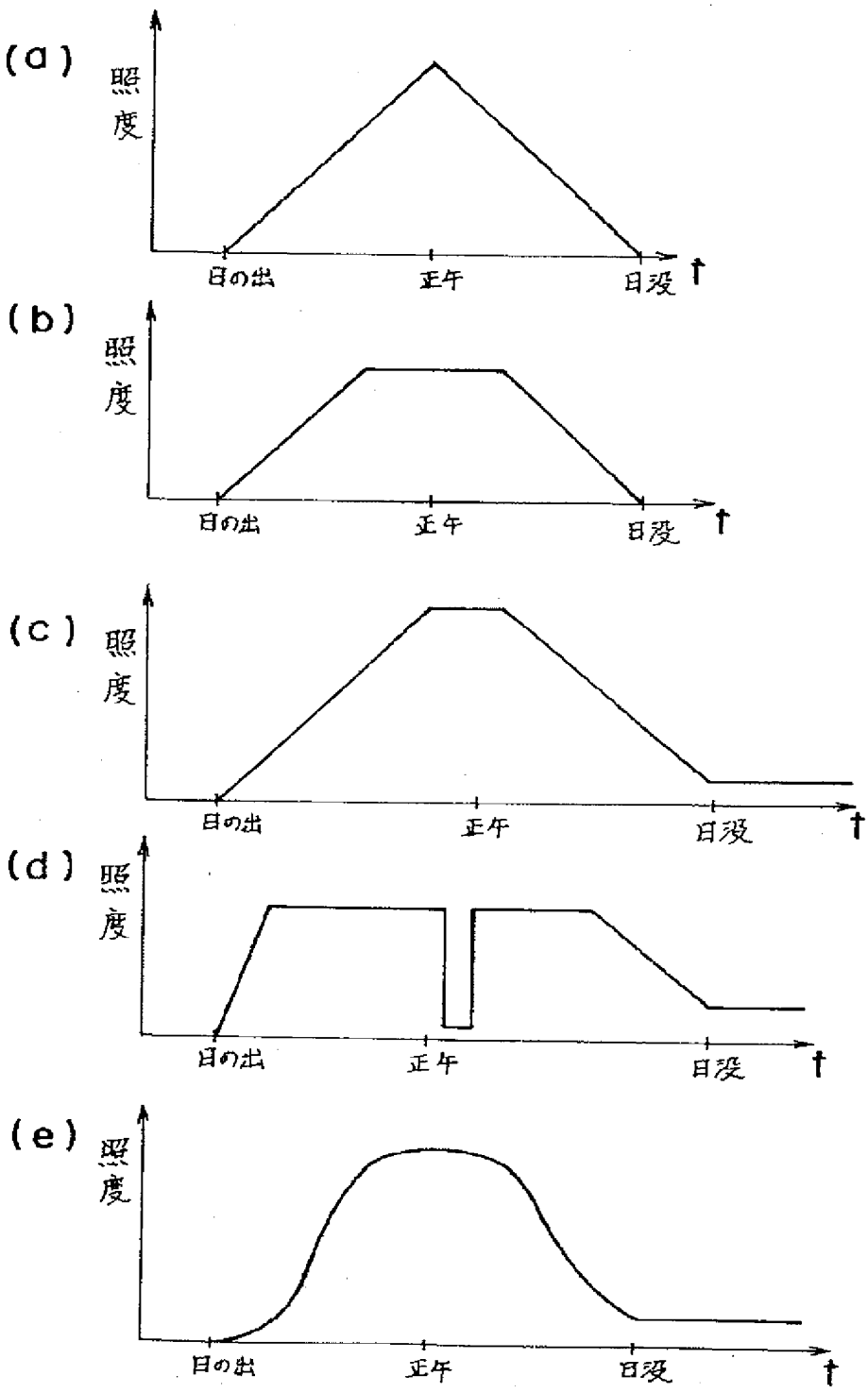
【図１６】


3
4
5
電力供給部
点灯装置
照明負荷
36
調光データ出力部
31
35
調光データ演算部
カレンダータイマー
32
調光データ時系列データベース
タイマー
33
電力制御部
34

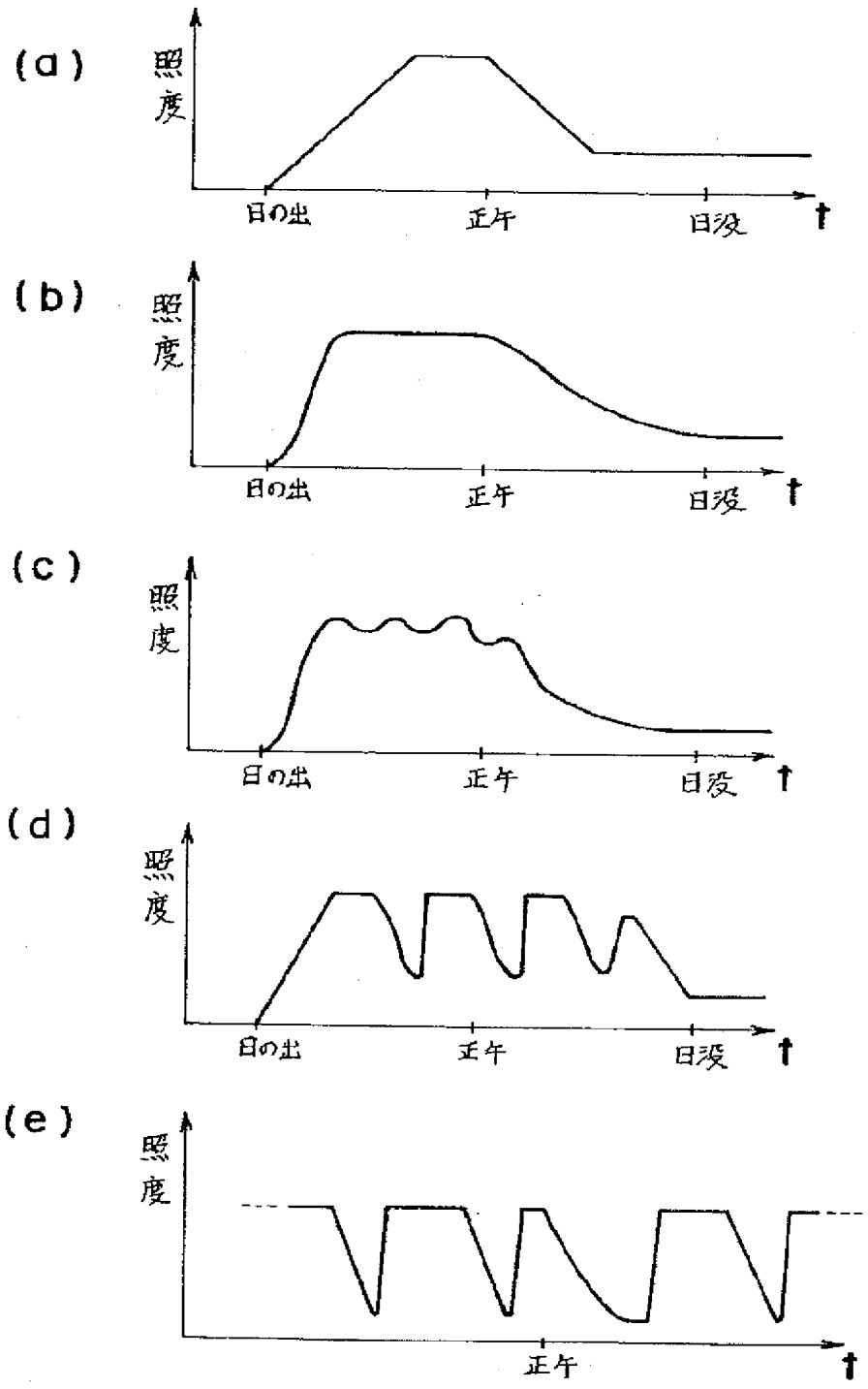
【図３２】


56
51a
50a
55
54
62a
49
52
M
57

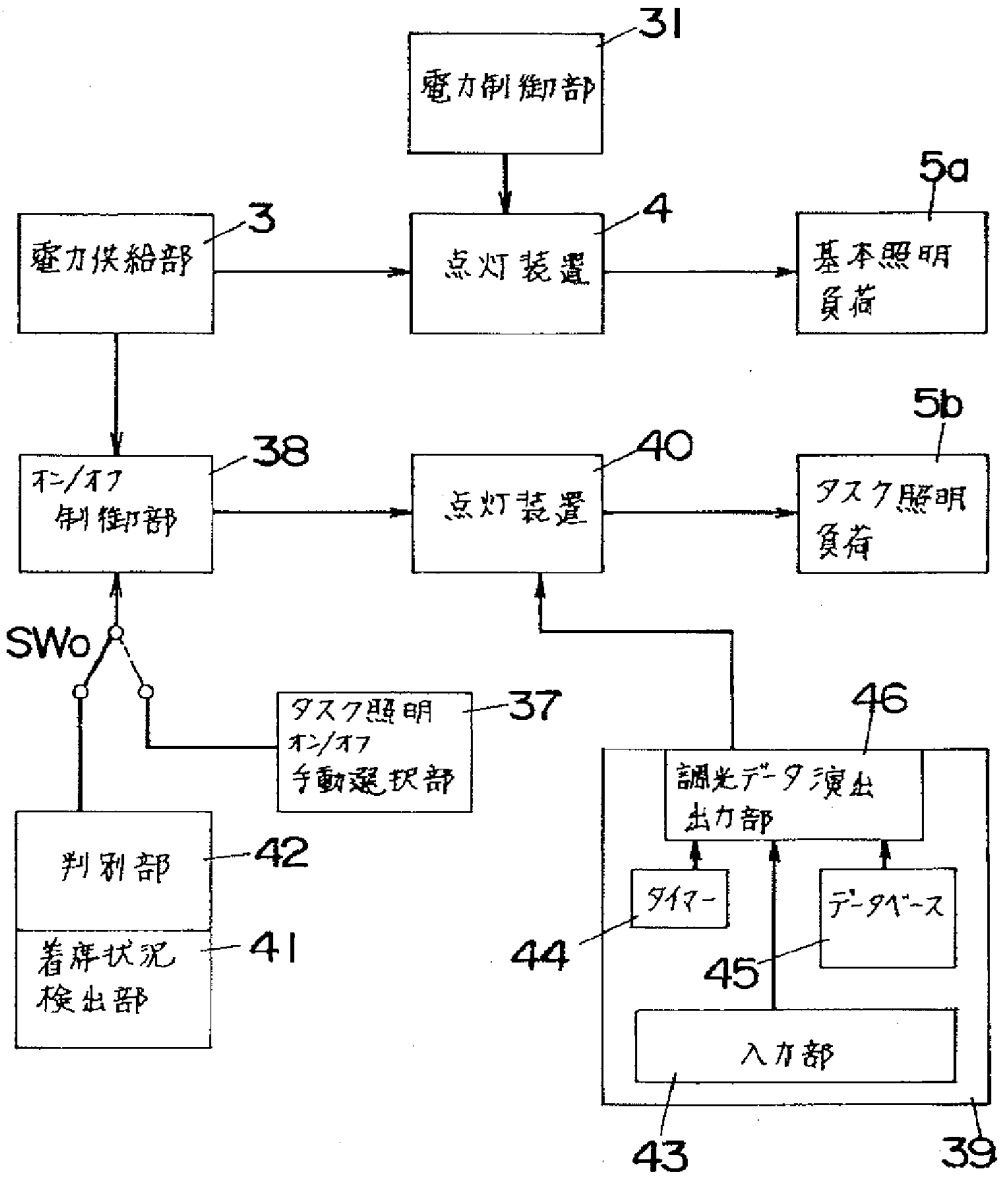
【図１７】


(a)
照度
日の出
正午
日没
t
(b)
照度
日の出
正午
日没
t
(c)
照度
日の出
正午
日没
t
(d)
照度
日の出
正午
日没
t
(e)
照度
日の出
正午
日没
t

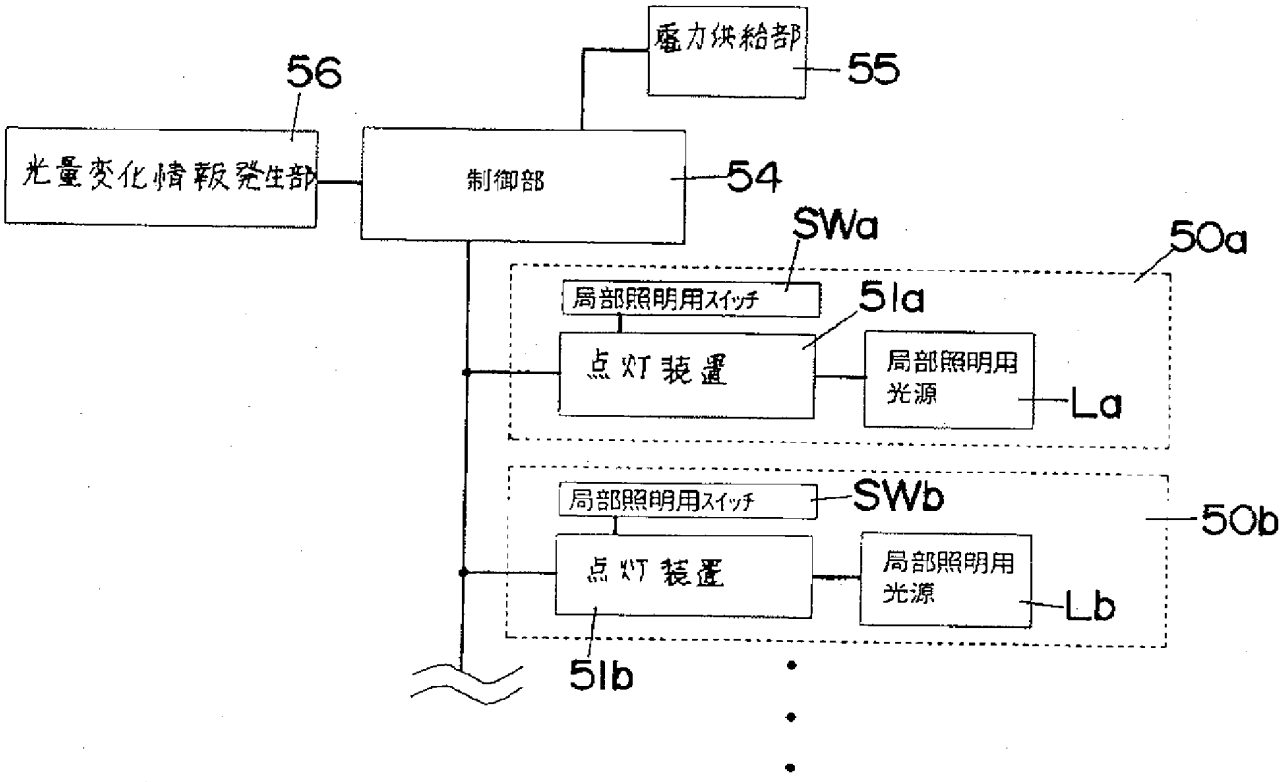
【図１８】


(a)
照度
日の出
正午
日没
t
(b)
照度
日の出
正午
日没
t
(c)
照度
日の出
正午
日没
t
(d)
照度
日の出
正午
日没
t
(e)
照度
正午
t

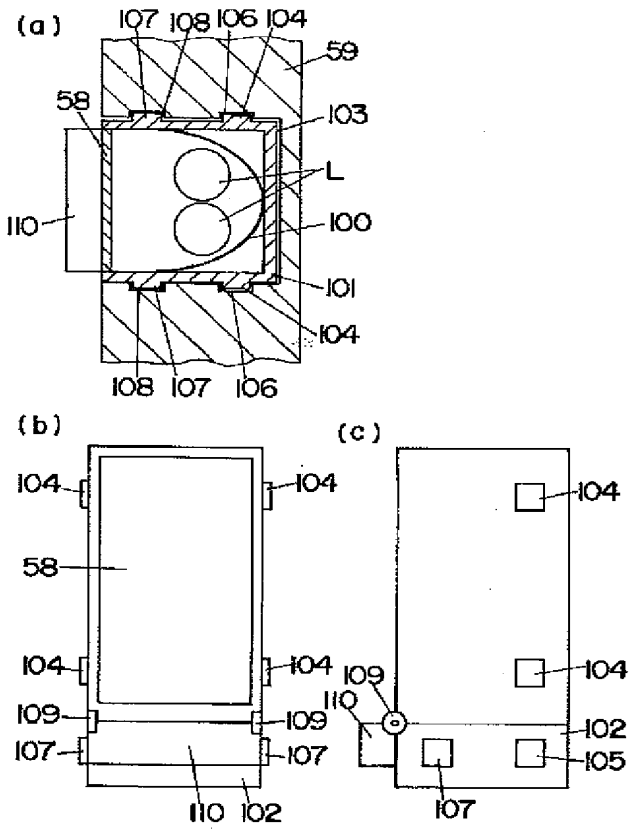
【図２０】


31
電力制御部
5a
3
4
電力供給部
点灯装置
基本照明
負荷
5b
38
40
オン/オフ
制御部
点灯装置
タスク照明
負荷
SWo
タスク照明
オン/オフ
手動選択部
37
46
調光データ演出
出力部
判別部
42
タイマー
データベース
着席状況
検出部
41
44
45
入力部
43
39

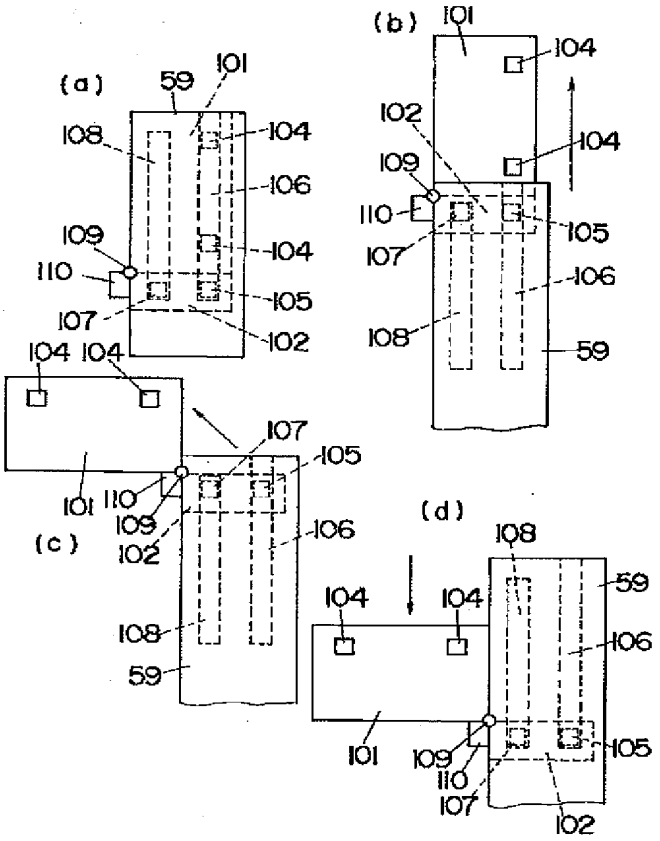
【図２３】


電力供給部
55
56
光量変化情報発生部
制御部
54
SWa
50a
局部照明用スイッチ
51a
点灯装置
局部照明用光源
La
局部照明用スイッチ
SWb
50b
点灯装置
局部照明用光源
Lb
51b

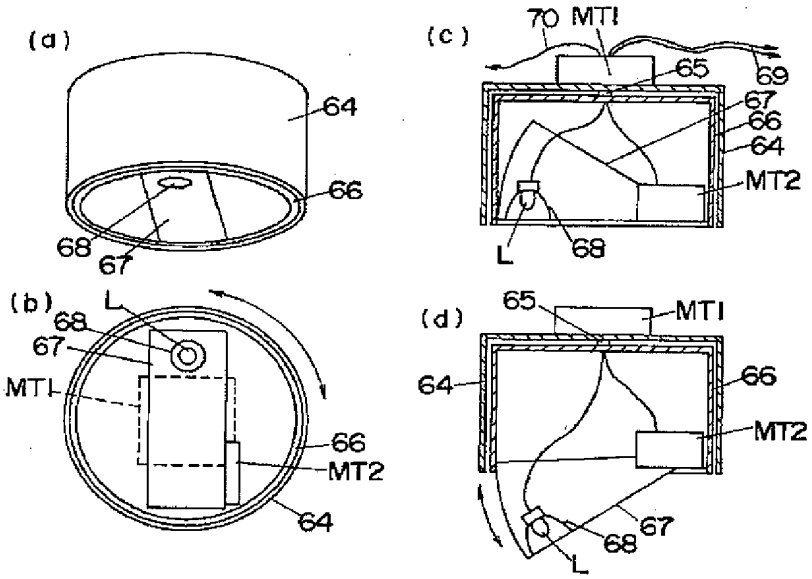
【図２８】


(a)
107 108 106 104
59
58
103
L
110
100
101
104
108 107 106
(b)
104
104
58
104
104
109
109
107
107
110 102
(c)
104
104
109
110
102
105
107

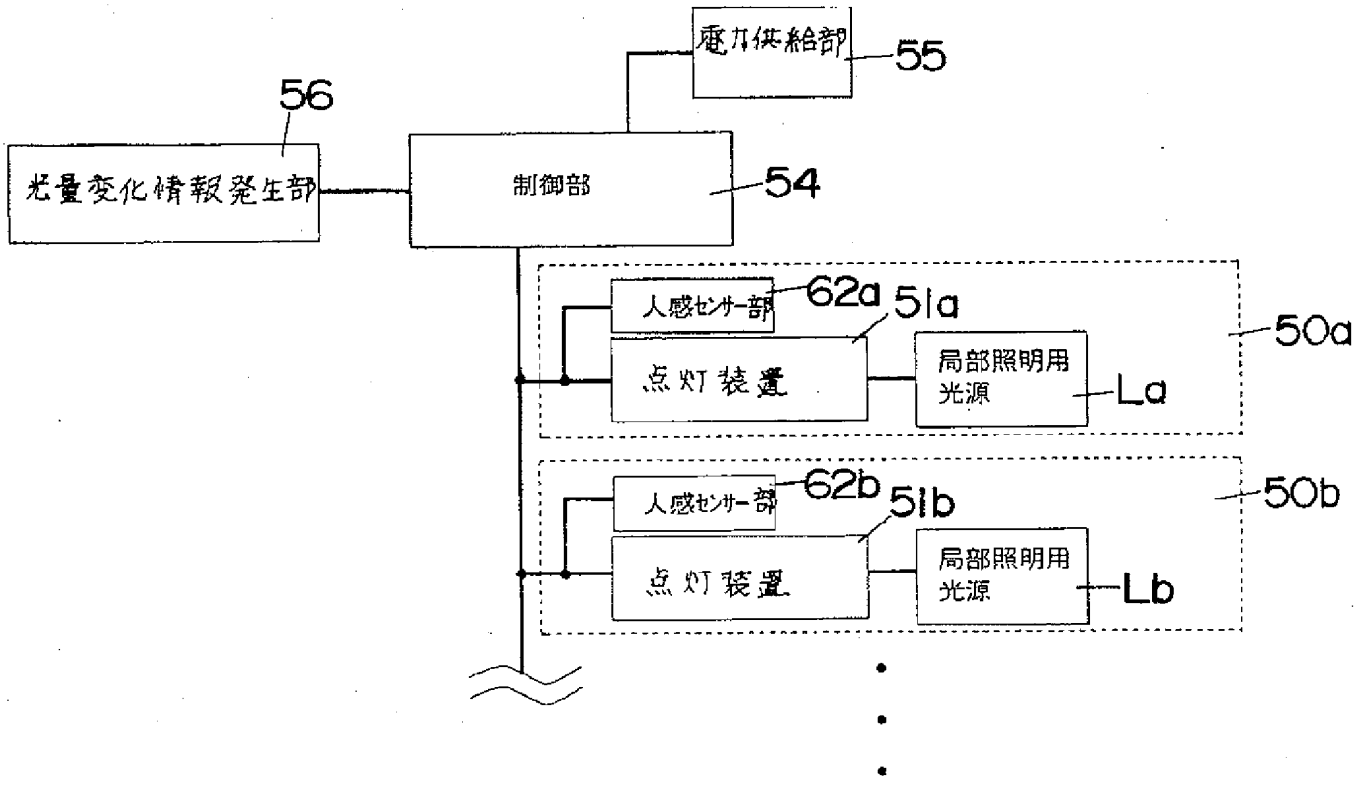
【図２９】


(a)
59
101
108
104
106
109
110
104
105
107
102
104 104
107
105
101
110
109
102
106
(c)
108
59
(b)
101
104
102
104
109
110
105
107
106
108
59
(d)
108
59
104
104
106
101
109
110
107
105
102

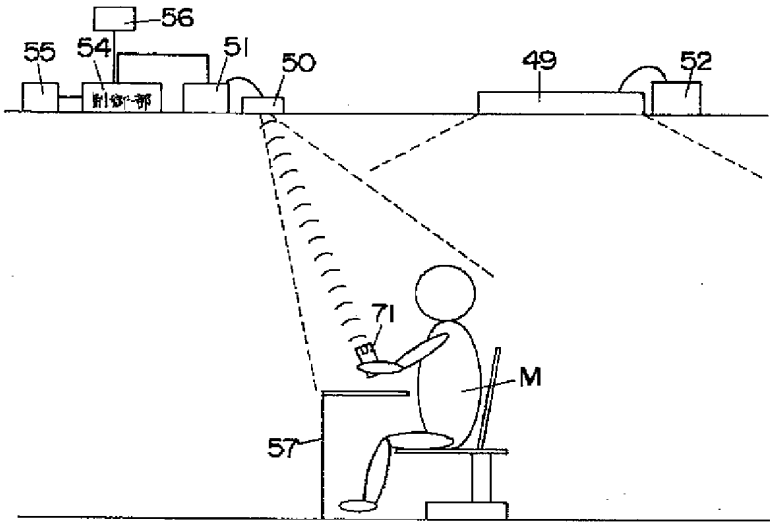
【図３４】


(a)
64
66
68
67
(b)
L
68
67
MT1
66
MT2
64
(c)
70
MT1
65
69
67
66
64
MT2
L
68
(d)
65
MT1
64
66
MT2
67
68
L

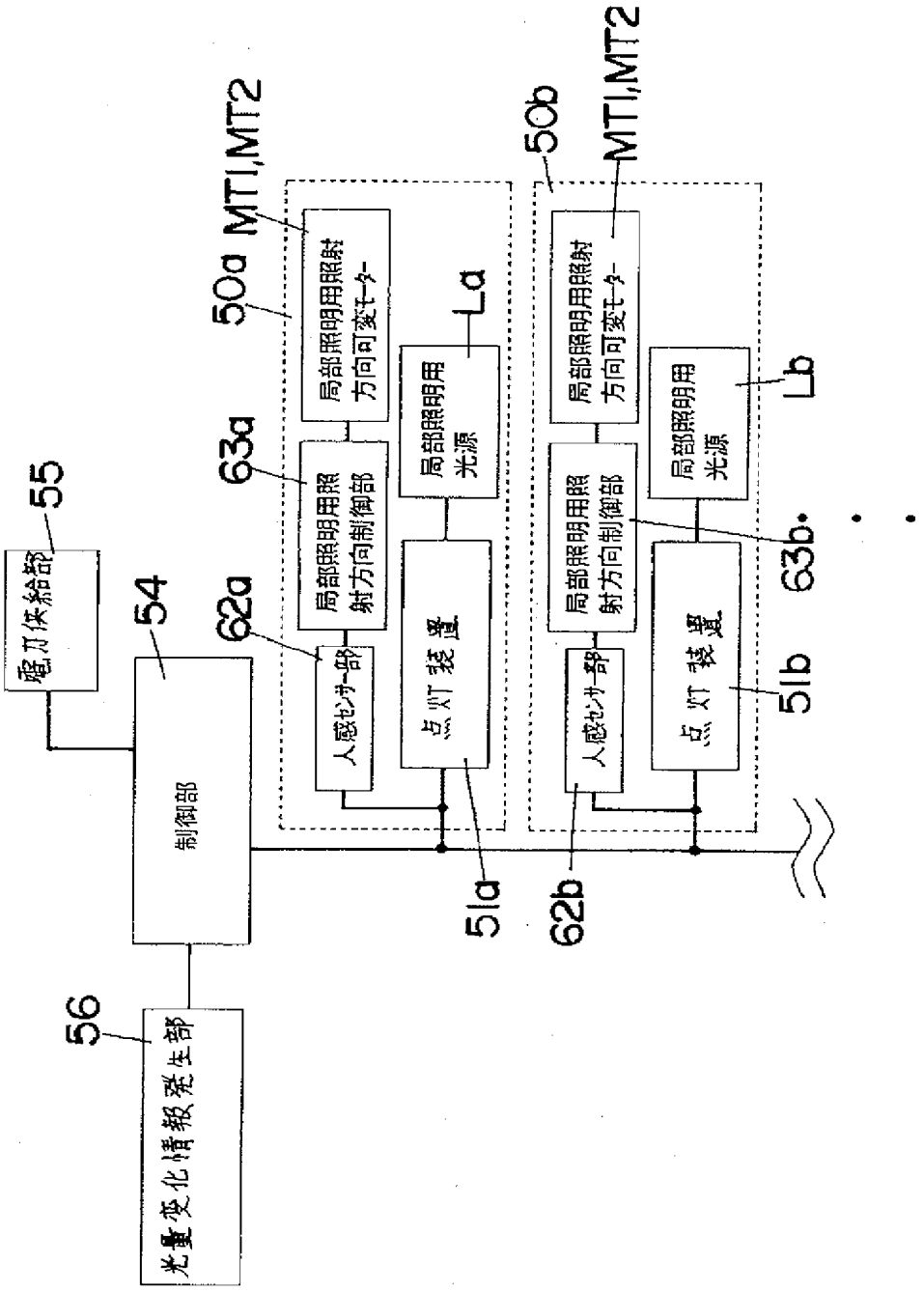
【図３１】


電力供給部
55
56
光量変化情報発生部
制御部
54
人感センサー部
62a
51a
50a
点灯装置
局部照明用光源
La
人感センサー部
62b
51b
50b
点灯装置
局部照明用光源
Lb

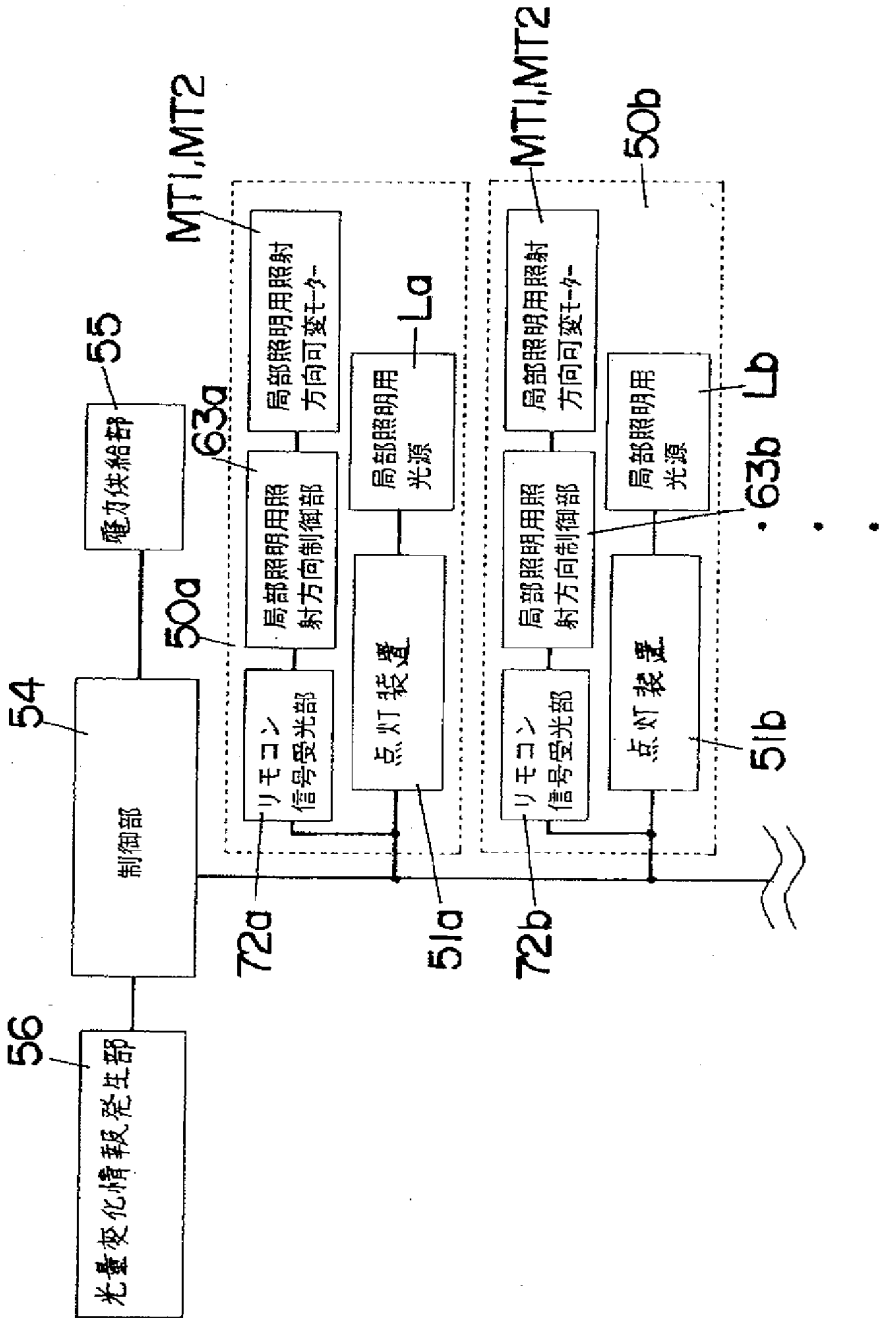
【図３５】


56
55
54
51
50
49
52
71
M
57

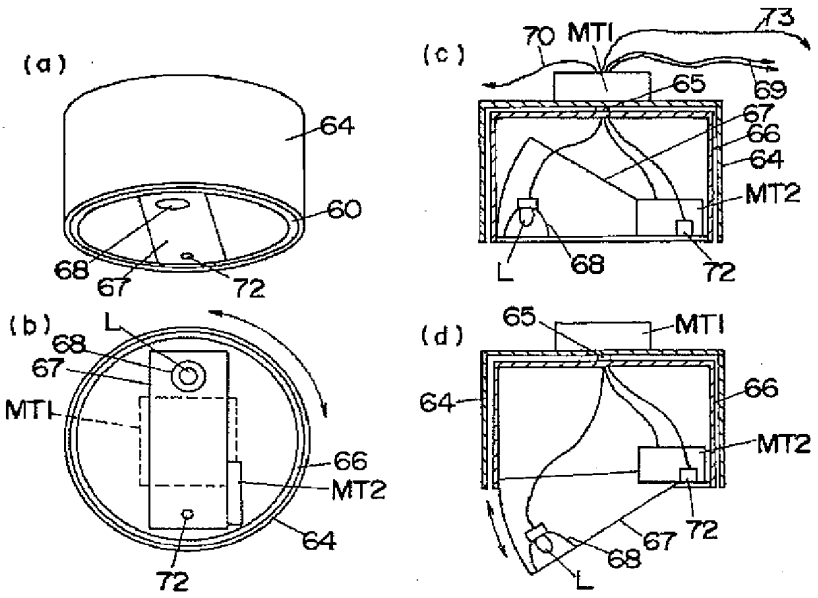
【図３３】


電力供給部
55
制御部
54
光量変化情報発生部
56
50a
MT1,MT2
局部照明用照射方向可変モータ
局部照明用照射方向制御部
63a
人感センサー部
62a
局部照明用光源
La
点灯装置
51a
50b
MT1,MT2
局部照明用照射方向可変モータ
局部照明用照射方向制御部
63b
人感センサー部
62b
局部照明用光源
Lb
点灯装置
51b

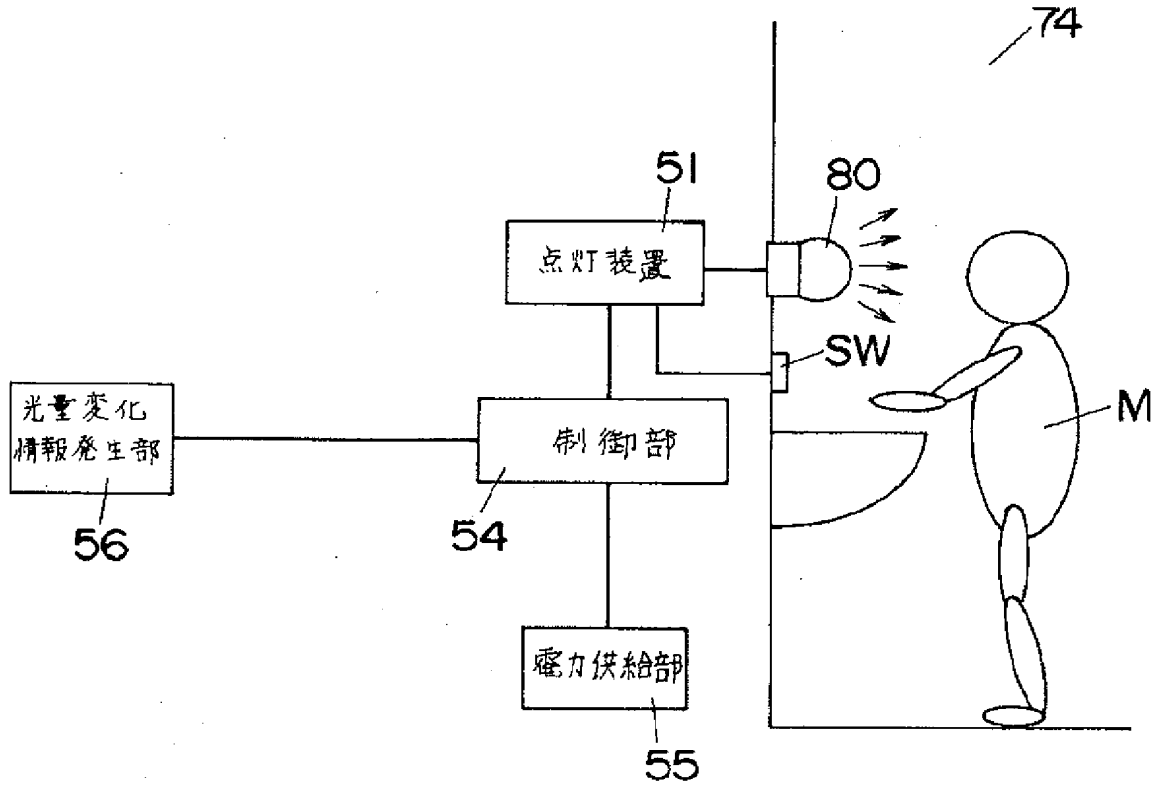
【図３６】


光量変化情報発生部
56
制御部
54
電力供給部
55
50a
局部照明用照射方向可変モータ
局部照明用照射方向制御部
63a
局部照明用光源
La
点灯装置
51a
リモコン信号受光部
72a
MT1,MT2
50b
局部照明用照射方向可変モータ
局部照明用照射方向制御部
63b
局部照明用光源
Lb
点灯装置
51b
リモコン信号受光部
72b
MT1,MT2

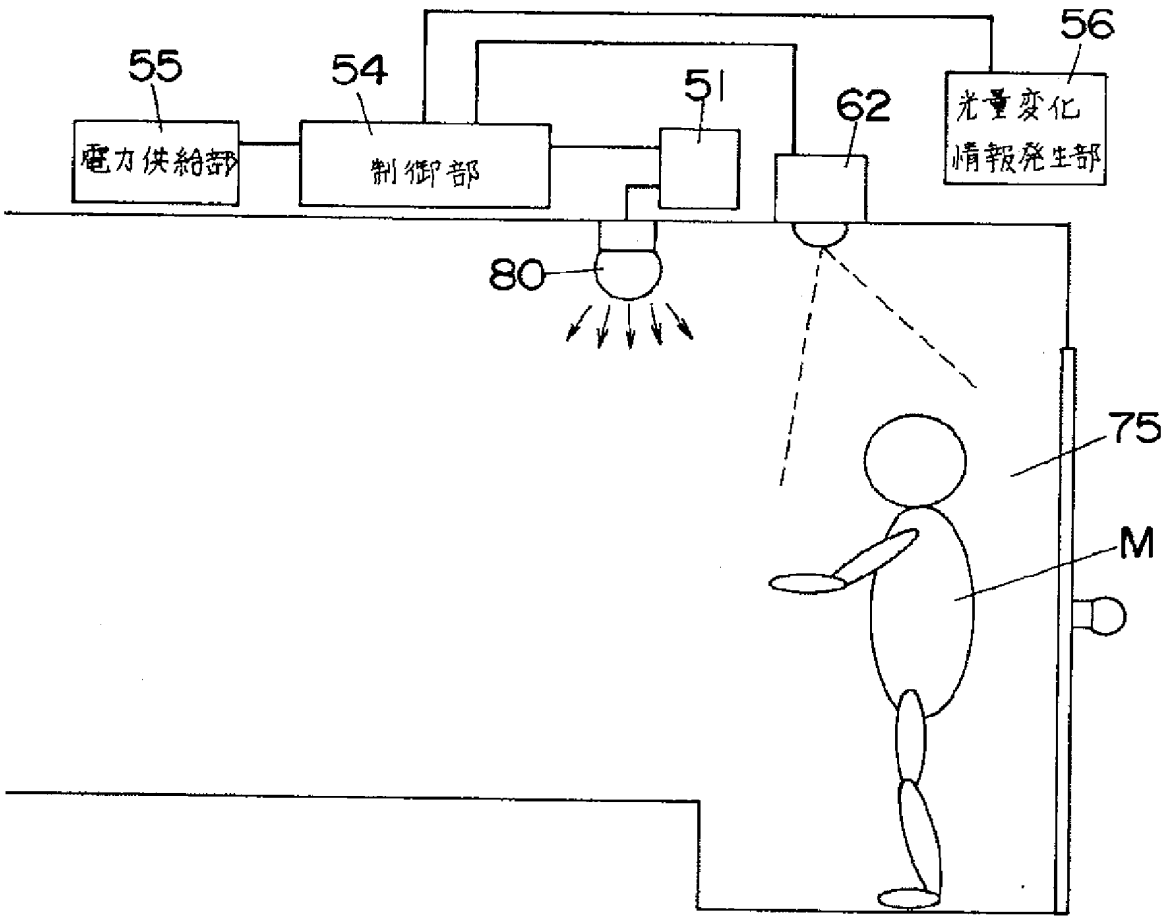
【図３７】


(a)
64
60
68
67
72
(b)
L
68
67
MT1
66
MT2
64
72
(c)
70
MT1
73
65
69
67
66
64
MT2
L
68
72
(d)
65
MT1
64
66
MT2
72
67
68
L

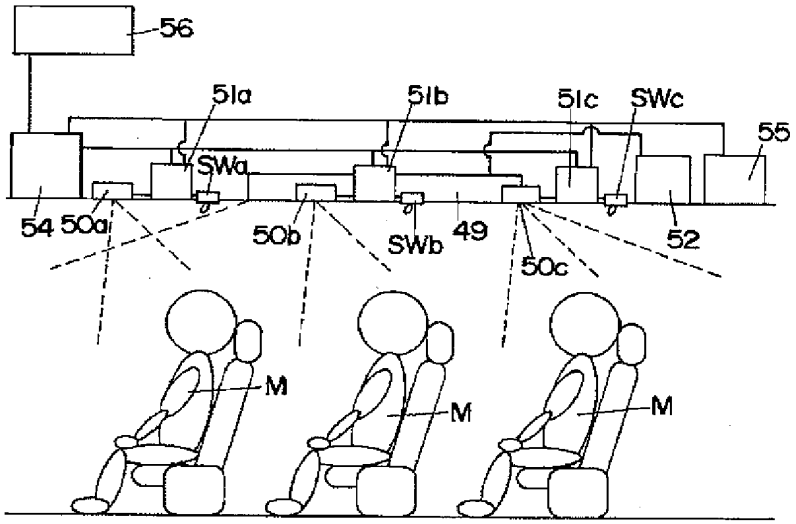
【図３８】


74
51
80
点灯装置
SW
M
光量変化
情報発生部
制御部
56
54
電力供給部
55

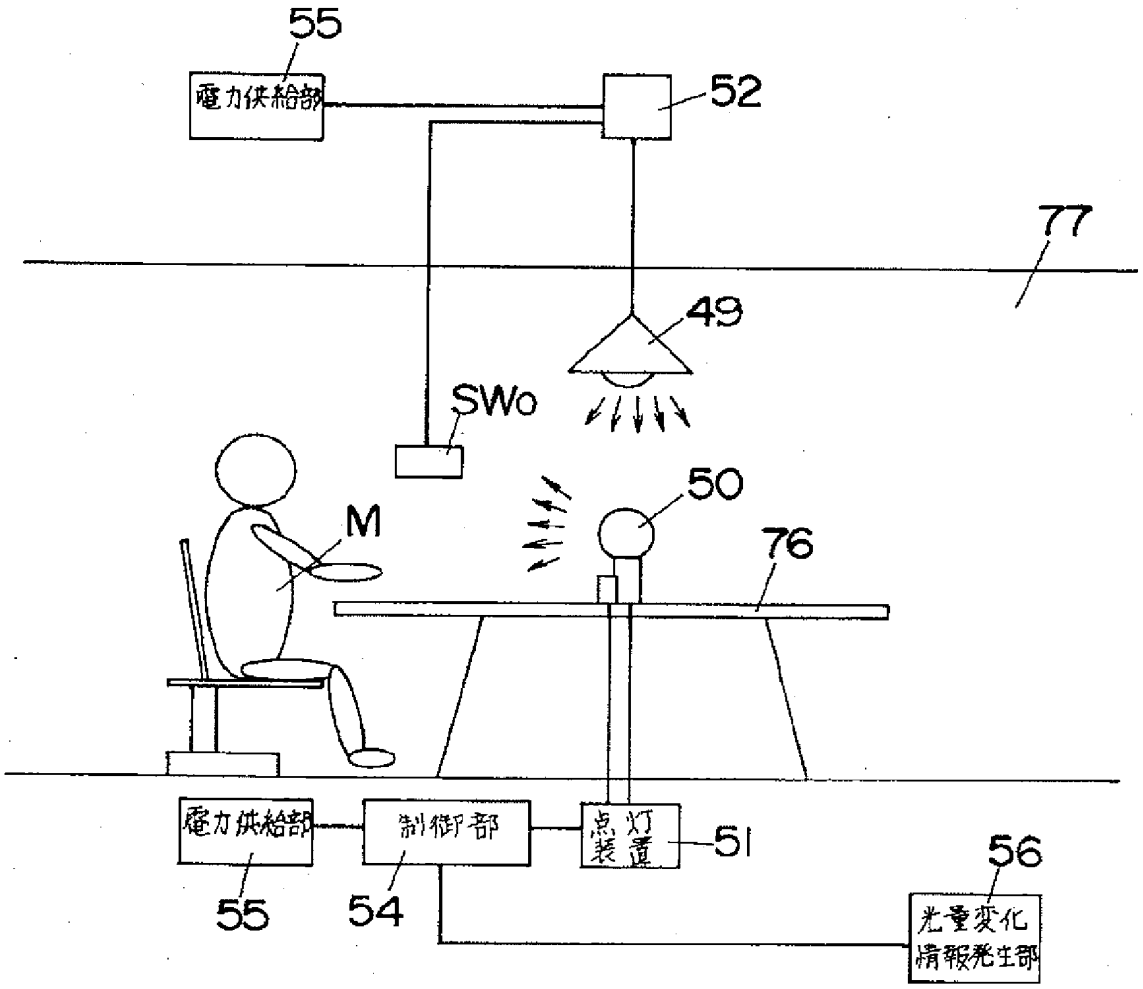
【図３９】


55
54
51
62
56
電力供給部
制御部
光量変化
情報発生部
80
75
M

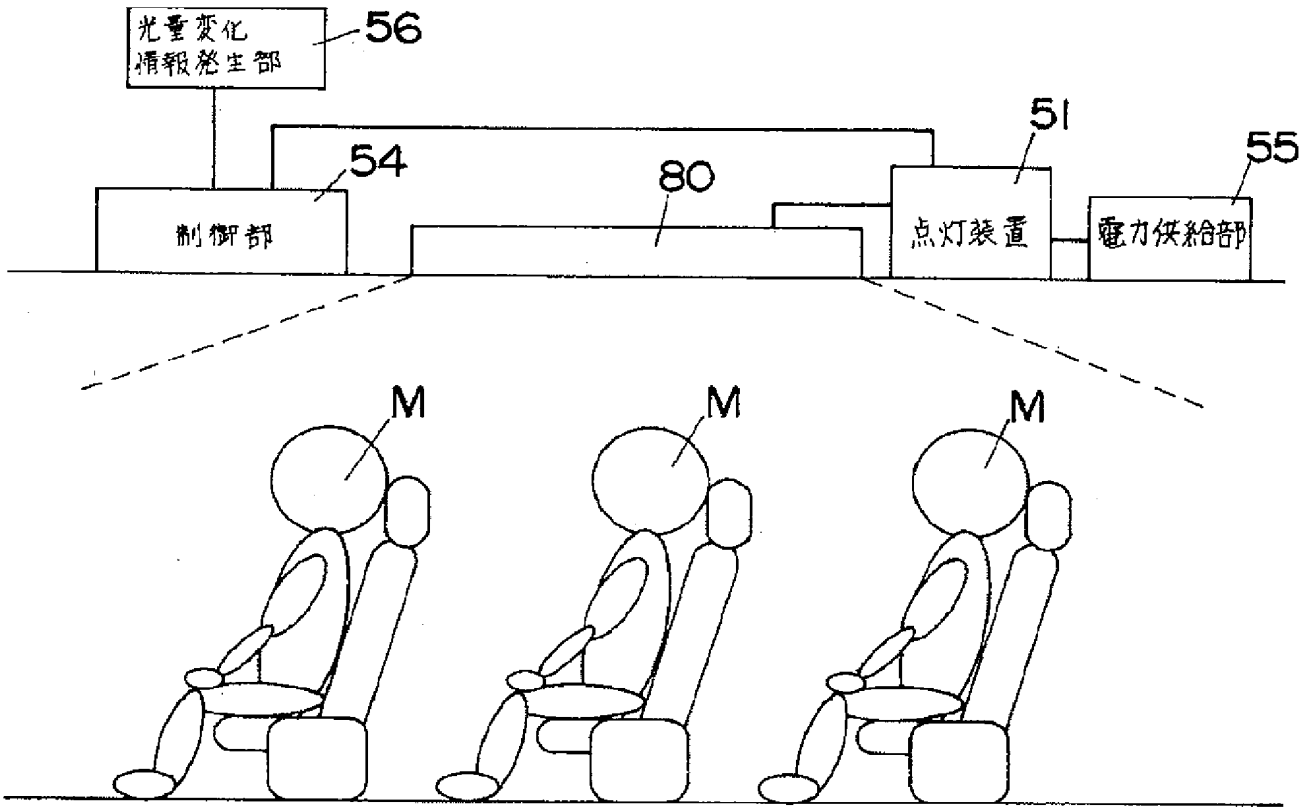
【図４２】


56
51a
51b
51c
SWc
55
SWa
54
50a
50b
SWb
49
52
50c
M
M
M

【図４０】


55
電力供給部
52
77
49
SWo
50
M
76
電力供給部
制御部
点灯装置
51
56
光量変化情報発生部
55
54

【図４１】



フロントページの続き

(72)発明者　森井　彰一
大阪府門真市大字門真1048番地松下電工株式会社内
(72)発明者　中野　紀夫
大阪府門真市大字門真1048番地松下電工株式会社内
(72)発明者　萩原　啓
大阪府門真市大字門真1048番地松下電工株式会社内
(72)発明者　今井　健之
大阪府門真市大字門真1048番地松下電工株式会社内
(72)発明者　臼井　久視
大阪府門真市大字門真1048番地松下電工株式会社内
(72)発明者　丹羽　正克
大阪府門真市大字門真1048番地松下電工株式会社内